



Feidhmeannacht na Seirbhíse Sláinte  
Health Service Executive

## HSE Estates

### Sustainable Healthcare Building Guidelines

#### Specification, design, construction and refurbishment of Healthcare Buildings

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### Disclaimer

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## **1.0 Purpose of Sustainable Healthcare Building Guidance**

The HSE's mission statement is 'to enable people live healthier and more fulfilled lives'. There is an intrinsic relationship between health service, the health of the population, and their environment. Healthcare building design and construction can protect health on three levels; protecting the health of the building occupants, protecting the health of the local community, and protecting natural resources.

The success of a building's performance in terms of sustainability is dependent on critical decisions taken at the design, procurement, and construction stages. The HSE Estates Sustainable Healthcare Building Guidance is a reference for new building specification, and the refurbishment of existing healthcare buildings.

In the case of new buildings, it is envisaged that the Sustainable Healthcare Building Guidance will be adopted at the project inception stage, and referenced through to building completion and occupation. Refurbishments on existing buildings, can also adopt the guidance, but implementation may be restricted.

The objective of the HSE Estates Sustainable Healthcare Building Guidance is to guide HSE Estates to achieve the most sustainable buildings from; site selection, procurement, construction, energy, water, waste, wastewater, and transport perspectives. The Sustainable Healthcare Building Guidance is broadly in keeping with BREEAM (Building Research Establishment Environmental Assessment Method) a recognised UK and European standard for sustainable building design, although not formally adopted in Ireland. BREEAM International standard is currently being applied on a pilot basis to a HSE mental health project in Portrane Co. Dublin.

## **2.0 Health Service Executive**

The HSE is Ireland's largest public sector employer (104,000 employees 2012). The HSE has an annual budget of €14 Billion. The health sector's carbon footprint is primarily related to procurement of goods and services (61%), building energy consumption (17%) transport energy consumption (13%) and community health services energy consumption 9%. The HSE is the largest public sector procurer of goods and services (€4 Billion) in Ireland.

The HSE has an extensive building portfolio with approximately 2,655 healthcare properties (2011): Hospitals, Residential Units, Health Centres, Dental Clinics, Offices, and Procurement Stores, Ambulance Bases etc. Some healthcare facilities operate 24 hours, 365 days per year, with high energy usage, waste generation and water consumption. The HSE Annual expenditure for energy, waste and water is over €120 million per annum.

The Government allocate to the HSE annual Capital funding of €334m for each year from 2012 to 2016. In procuring capital projects, Estates Managers need to actively engage HSE contractors to ensure appropriate sustainability choices are implemented.

Policies are essential tools in improving the quality of health care provision, as policies articulate best practice, standardise service delivery and act as a basis for audit and evaluation. The HSE Estates has developed this Sustainable Healthcare Building Guidelines to;

1. Improve building sustainability.
2. Meet HSE and stakeholder expectations
3. Maintain healthy links with the community served.

### **3.0 HSE Estate Roles and Responsibilities**

Sustainable Healthcare Building Guidelines are based on the legislative framework which relate to the health sector. The Estates Manager, Environmental Services is responsible to review the Sustainable Healthcare Building Guidelines on a periodic basis as legislation requires. The Head of Estates, Assistant National Directors, and Estates Managers are responsible for implementing the Sustainable Healthcare Building Guidelines within their respective remits.

Estate Managers have responsibility of being aware of the intended performance and operation of healthcare buildings, their actual performance, and to seek continuous improvement through investigation, communication, training, maintenance and review procedures. Well designed healthcare buildings provide a high quality building environment which encourages patient recovery and staff performance.

**A range of Sustainable Healthcare Building options are outlined below. However, some are in fact legal obligations with which the HSE must comply. Legal obligations are indicated by the checklist symbol  and reference the relevant Regulations.**

#### **3.1 Health Sustainability Office**

At the HSE Senior Management Team Meeting of April 9<sup>th</sup> 2013, HSE Estates were requested to develop a Sustainability Policy within the HSE. The HSE Estates established the Health Sustainability Office in collaboration with HSE Procurement and HSE Finance. The National Health Sustainability Office (NHSO) will manage the implementation of a national Sustainability Plan for the HSE, with clearly identified targets and objectives. The primary scope of the Health Sustainability Office will be the management of energy, waste and water nationally for the HSE and the procurement of related services and equipment. The National Director of Shared Services Chairs the Health Sustainability Office Steering Group. Refer to [www.hse.ie/sustainability](http://www.hse.ie/sustainability)

## 4.0 Sustainable Healthcare Building Design

### 4.1 Site Selection

Sustainable buildings start with site selection. The location of a healthcare building affects a wide range of factors such as orientation, energy consumption, access and the reuse of existing infrastructure etc.

1. Capital Appraisal for new healthcare buildings, refurbishments, and plant replacements, *should* specify projects which are sustainable in terms of **capital and operational/maintenance costs over the proposed building lifetime** (30 to 60 years).
2. *Where possible refurbish and reoccupy existing HSE buildings* rather than construct new buildings.
3. If a new building is required for clinical purposes, **maximise development density** on existing HSE lands, rather than construct new buildings on previously undeveloped lands.
4. Land that has high **flood risk** (greater than 1% risk or 1 in 100 years for river flooding or 1 in 200 years for coastal flooding) *should not* be developed.
5. **Transport** accounts for approximately 16% of the health sector's carbon foot print, encompassing transport for staff, patients, visitors, goods deliveries, contractors and emergency services.
6. Healthcare building design should facilitate **healthy travel options** for staff, patients, and visitors. Specify safe walking and cycling access. Provide covered and secure bicycle parking, designate carpool parking and access to public transport links e.g. bus to local bus and train stations.
7. Locate new healthcare buildings within 0.4 km of **public transport** links i.e. rail station or bus stops. Link healthcare buildings to local rail/bus stations via direct bus services. Negotiate with public transport providers to secure public transport links.
8. Land designated for high **ecological value** i.e. protected habitats (Special Protection Area/Special Area of Conservation) *should not* be developed.
9. Designate areas of **natural environment** on each HSE campus as an important resource for patient recovery.
10. Post project completion, appraise actual **capital expenditure** to verify costs, and support future design construction and decision making.

## 4.2 Building Fabric

☑ = HSE Legal Obligation

The building fabric refers to the internal structure and external elements (roof, walls and floors) of a building. The most important energy efficiency factors to consider in the design of the building fabric are insulation, air tightness, window design and thermal bridge avoidance.

11. ☑ Refer to Building Regulations 2011 **Technical Guidance Document Part L, Conservation of Fuel and Energy – Buildings other than Dwellings**, for guidance on how to construct a building so that it complies with the energy efficiency and renewable energy conservation aspects of the Building Regulations 2011.

12. ☑ Specify building materials i.e. concrete, timber, steel etc., for the walls, windows, floors, and roof in compliance with **U values set out in Part L of the Building Regulations 2011**. The U value is a measure of the amount of heat loss that will pass through the building element (walls, roofs windows etc). The building elements should have a low U value with the appropriate depth of insulation.

13. **Design appraisals** *should* promote energy efficient buildings which reduce electricity / fossil fuel consumption and costs. Design of the heating, cooling, ventilation, lighting and hot water systems will determine the majority of a building's energy costs.

14. The Irish Government's **Green Public Procurement Action Plan** *recommends* use of low carbon construction materials as a means of reducing a building's environmental impact. Specify **low carbon cement** mixed with regular Portland cement (CEM I or CEM II/A). The Irish Concrete Standard I.S. EN 206, makes provision for the use of several alternative low carbon cements, as partial replacement of regular Portland cement (CEM I or CEM II/A) in concrete. Specification of low carbon cement (i.e. GGBS) in ready mix concrete and precast concrete typically includes:

(a) A cement combination comprising a minimum of **50%** low carbon cement and CEM I or CEM II/A (cement type) to be used in all **substructure** (below ground level) concrete throughout the project, unless otherwise specified by the project Engineer.

(b) A cement combination comprising a minimum of **40%** low carbon cement and CEM I or CEM II/A to be used in all **superstructure** (above ground level) concrete throughout the project, unless otherwise specified by the project Engineer.

(c) A cement combination comprising a minimum of **35%** low carbon cement and CEM I or CEM II/A to be used in **power-floated floors** at or above ground level throughout the project, unless otherwise specified by the project Engineer.

(d) A cement combination comprising a minimum of **25%** low carbon cement and CEM I or CEM II/A to be used in all **precast** concrete throughout the project, unless otherwise specified by the project Engineer.

15. Consider **re-insulating** the walls and roofs in existing buildings. Wall insulation options are: a) injection of cavity walls b) internal insulation dry lining c) external wall insulation (may be subject to planning permission).

16. The roof/attic insulation options are: mineral wool, blown fibres, or rigid board lay between joists or fixed to the underside of rafters.

17. All service pipe work should be insulated with either rigid foam collars or foil backed fibreglass insulation with a thickness greater than 25mm.

18. Avoid **thermal bridging**, where building materials which are poor insulators come into contact. Refer to the Sustainable Energy Authority of Ireland's (SEAI) "Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details" guidance during the design, construction and building fabric testing stages. [www.seai.ie](http://www.seai.ie)

19.  Thermal imaging or **air leakage** tests should identify heat loss and confirm the building achieves minimum air leakage standards set by the Building Regulations 2011. Specify that the main contractor test a new building external fabric before the internal building fit out phase begins.

20. The design brief should specify **natural ventilation**, and minimise the need for air conditioning (except for clinical purposes). If mechanical ventilation is required consider heat recovery system to provide fresh air and climate control, while saving energy by reducing the heating (and cooling) requirements.

21.  Specify **window U values** set out in the Building Regulations 2011. Building window design will influence energy efficiency and comfort. Windows increase daylight, but may also incur excess solar heat gain in summer months or heat loss in winter months.

22. Specify low **embodied energy and CO<sub>2</sub>e** construction products and materials. SEAI plan to publish guidance on Irish Embodied Energy and Carbon Measurement Methodology and the associated databases. [www.seai.ie](http://www.seai.ie)

23. Where available specify **buildings materials** which are certified as sustainable i.e. EU Eco Label (floor coverings for example), Forest Stewardship Council Timber, and where available, products made from recycled raw material.



### 4.3 Energy Specification

= HSE Legal Obligation

The **National Energy Efficiency Action Plan (NEEAP) 2009 - 2020** sets a public sector target of 33% reduction in energy usage to be achieved by 2020. The HSE should implement this target across the range of existing buildings particularly during refurbishment, and at the design stage for new buildings.

24.  In accordance with Energy Performance of Buildings Regulations (S.I. No. 243 of 2012), any **new HSE buildings** with a gross internal floor area greater than **250m<sup>2</sup>** must display a Building Energy Rating of **A or B minimum**, from 2015. There are approximately 1,550 HSE buildings with a gross internal floor area greater than **250m<sup>2</sup>**.

25.  The Energy Performance of Buildings Regulations (S.I. No. 666 of 2006) requires that for **new** buildings with a gross internal floor area greater than **1,000 m<sup>2</sup>** the HSE must give consideration “*to the technical, environmental and economic feasibility of installing **alternative energy sources***” and that the use of such systems (de-centralised renewable energy supply systems, biomass combined heat and power, district heating cooling, and/or heat pumps) has been taken into consideration in the design.

26.  The Energy End Use Efficiency **Regulations S.I. No. 542 of 2009** requires that public bodies can only **purchase or lease** buildings with Building Energy Ratings of **A3** or higher from 2015.

27.  Any healthcare building (typically Acute Hospitals) with **boiler plant in excess 20 Mega Watt Thermal Output** must comply with the Environmental Protection Agency’s, Green House Gas Emissions Trading Permit (ETP) scheme in relation to Carbon (CO<sub>2</sub>) dioxide emissions.

28.  The EU (Energy Efficient Public Procurement) Regulations 2011 (S. I. 151 of 2011) compel public bodies like the HSE only to procure equipment or vehicles which are registered with the SEAI on the **Triple E Product Register**. The Triple E Product Register contains a list of products which comply with the SEAI energy efficiency criteria:

- a. Building Energy Management Systems,
- b. Lighting
- c. Motors & Drives,
- d. Information and communications technology (ICT)
- e. Heating
- f. Heat Ventilation Air Con (HVAC)
- g. Electric & Alternative Vehicles
- h. Refrigeration & Cooling
- i. Catering & Hospitality Equipment



29.  Specify lighting which is Triple E Registered. Lighting can be the single largest electrical energy consumer in buildings. Refer to [www.seai.ie/public](http://www.seai.ie/public) for SEAI guidance on best practice **healthcare lighting applications**.

30. The feasibility of a **Building Energy Management Systems (BMS)** is generally specified where there are multiple heating zones and more than one type of plant serving the building (boilers, chillers and air handling plant).

31.  Specify a BMS which is SEAI Triple E Registered. The management, design, validation, and operation of the BMS should comply with the HTM 2005 Building Management System.

32. If an **Energy Services Company (ESCO)** is contracted to finance energy plant, and manage energy on site with remuneration linked to energy savings achieved over the term of the ESCO contract. Consult with the ESCO at the design stage to ensure that the proposed building design compliments energy requirements.

33. Estimate the baseline **energy demand**, to assess how to reduce the energy demand with use patterns, security of supply, opportunities for renewable energy (wind power, solar thermal, biomass, geothermal etc) and life cycle costs.

34. The National Health Service (NHS) in the UK recommends specifying **35 - 55 GJ/100m<sup>3</sup> energy efficiency performance** for the healthcare estate in all new capital developments and major refurbishments; and that all existing facilities should achieve a target of **55 - 65 GJ/100m<sup>3</sup> energy performance**. (1 gigajoule (GJ) is equal to 277.7 kilowatt hours (kWh)).

35. In large hospitals which require independent energy generation, **Combined Heat and Power (CHP)** boilers are recommended. Also examine the feasibility of bio-mass CHP boilers (i.e. wood fuels) when specifying heating boilers.

36. Hospital **Laundry, Kitchens, Operating Theatres and Sterile Services** are large users of electricity, and merit sub-metering to monitor electricity consumption. Minimise the use of electricity, by using natural gas to power autoclaves or kitchen equipment.

37. Specify **sub-metering to electrical and mechanical** systems; air handling units, chillers, air conditioning, lighting, data centres, and critical equipment electrical distribution systems. Healthcare Electrical equipment with the highest electrical load include; Diagnostic imaging; X-Ray, Magnetic resonance imaging (MRI), sterilisation, and laundry equipment etc.

38. The design brief should specify natural **lighting** (daylight factor of 2% minimum) to reduce the need for artificial lighting. Choose the **optimum orientation** (facing south) for a new build to maximise natural daylight, and minimise summer overheating. Lighting should be dimmable controlled with PIR motion and/or day light detectors.
39. Specify **passenger/goods lift's** capable of running on stand-by mode during off peak and idle periods i.e. lights and ventilation in the lift turn off.
40. Specify the **heating system controls** with time and temperature controls (with outside temperature compensation) and allow for separate zones of the building to be time and temperature controlled independently.
41. A non technical building **user guide** should be compiled by the design team which explains the correct operation of the building and all the building systems for the HSE Building Manager.
42. As part of **commissioning process** for new buildings, verify that the Building Energy Management Systems are installed, calibrated and perform according to installation documents. HSE Maintenance staff should have the training required to operate and maintain a Building Energy Management System effectively.
43. Heavy fuel oils should be stored in **double bund fuel tanks** to prevent fuel contaminated soil and groundwater. All tanks should be fitted with a contents meter and an electronic alarm to warn of a fuel leak.

#### 4.4 Water Management

= HSE Legal Obligation

44.  Under sink **food waste macerators are banned (S.I. No. 508 of 2009)** and should not be specified in catering facilities. Specify and install **Oil Fat and Grease interceptors** for catering waste water discharge. After interceptor, Oil fats and grease discharge should be less than 100 mg/litre.
45. Prevent pollution to water bodies (groundwater, surface water) by **separating storm water and foul sewer**. Specify and install **mineral oil interceptors** in vehicle parking areas and boiler drainage.
46. Estimate **baseline water use** and include sufficient storage to meet anticipated demand on the system. Dialysis, Sterile Services, Catering, Laundry, and Laboratories account for 30 per cent of acute hospital water usage and merit sub-metering to monitor consumption.
47. Specify **water efficiency** with particular attention given to design of water efficient boilers, catering equipment, dialysis, sterile services, laundry and sanitary appliances i.e. passive infrared detection urinals, dual flush toilets, aerated taps, low flow showers etc. Please consider water efficient products in the context of water quality risk management i.e. Legionella.
48. Surface water should be managed on-site using a **sustainable drainage system (SUDS)** to reduce the risk of flooding. The purpose of SUDS drainage techniques is to ensure that the rain water retention/infiltration characteristic of a building site remains the same after the building has been completed.
49. Consider **rainwater harvesting systems for large buildings** to eliminate the use of purchased treated drinking water being per m<sup>3</sup> and used for toilet flushing etc. Rain water harvesting is collection of rain which falls onto the roof of the building, and storing this water for reuse as landscaping, vehicle washing, or laundry services etc.
50. If **lead pipe work** or building materials are uncovered during renovations, replace with plastic (Polyethylene PE). From 2014, the acceptable lead standard in drinking water is 10ug/litre.
51. The electronic output from electromagnetic (pulse) water meters can be connected to a **Building Management System** to provide automatic campus wide leak detection.

## 5.0 Sustainable Construction

= HSE Legal Obligation

Although short term in duration, HSE Construction activities should not result in significant environmental pollution.

52.  Survey existing HSE buildings for **asbestos** prior to demolition or refurbishment. If asbestos is identified, refer to Statutory Instrument **S.I No. 386 of 2006** on exposure to Asbestos. Dispose of asbestos waste at an EPA licensed hazardous waste facility.

53.  Any clean inert demolition waste removed off site should be to an authorised waste facility (either a certificate of registration (less than 10,000 tonnes inert waste per site) or a waste permit (greater than 10,000 tonnes inert waste per site) or to an EPA licensed waste facility.

54. For building projects with a floor area greater than **1,250m<sup>2</sup>**, the main contractor should prepare a **construction waste plan** in accordance with Irish Construction Industry Federation Guidelines. The plan should maximise recycling and ensure that construction waste is transferred to authorised waste facility with either an EPA License or Local Authority Waste Permit.

55. HSE construction sites should have a **designated waste area** to facilitate segregation for reuse or recycling of clean inert soil, timber, steel, cardboard, plastic, inert rubble, contaminated soil and disposal of hazardous waste etc.

56. The main contractor should take all necessary measures to reduce local **air/dust pollution** arising from construction activities. This may include damping down the external site in dry weather conditions.

57. If legacy (predating 1996) healthcare waste landfill is uncovered during site clearance or pre construction stage contact the Local Authority and refer to the **EPA Code of Practice for Environmental Risk Assessment** of unregulated waste disposal sites. Contaminated soils should not be removed off site without prior agreement of the relevant local authority.

58. **Protect habitats** such as native trees, hedgerows and water courses particularly during construction phase of building projects.

## 6.0 Green Procurement Goods and Services

= HSE Legal Obligation

The majority (61%) of the health sector's carbon footprint is related to procurement of goods and services. The manufacture and supply of goods have environmental impacts associated with raw materials, pollution, energy, and distance travelled.

59. In 2012 the Irish Government published the **Green Public Procurement Action Plan, Green Tenders**. Refer to these guidelines when specifying procurement of products or services for;

- a) Construction
- b) Energy
- c) Food and catering services
- d) Transport
- e) Cleaning products and services
- f) Paper
- g) Uniforms and other textiles
- h) Information Communication Technology (ICT)

60. HSE Procurement has a [Procurement Policy \(Chapter 15 Environment\)](#), with the aim of achieving green procurement required by the Europe Commission. The HSE Procurement policies are published on [www.hsenet.ie](http://www.hsenet.ie)

61.  **The HSE can only purchase or lease** a building, or a portion of a building, where the building has a **Building Energy Rating** (BER) equal to or better than: A3 (from 2015). Refer to S.I. No. 542 of 2009.

62.  The HSE can only procure SEAI approved **Triple E Registered** energy efficient electrical/electronic equipment or equivalent for: Building Management Systems, Lighting, Motors/Drives, ICT, Heating, Heating Ventilation and Air Conditioning (HVAC), Electric & Alternative Vehicles, Refrigeration & Cooling, Catering & Hospitality Equipment etc. Refer to Energy Efficient Procurement Regulations (S.I. No. 151 of 2011).

63.  Only procure electric and electronic equipment from **Waste Electrical and Electronic Equipment** (WEEE) Registered Society suppliers. The HSE must verify whether a producer (supplier) is WEEE registered by obtaining a valid copy of the producer's current "Certificate of Registration" from the WEEE Register Society. Otherwise the supplier must be excluded from the procurement tender evaluation process. [www.weeeregister.ie](http://www.weeeregister.ie)

64. Materials used internally should have a low chemical content to minimise solvent off gassing of **VOC's (Volatile Organic Compounds)**. Wood panels, timber, wood flooring, textile and laminated floor coverings, suspended ceiling tiles, flooring adhesives, wall coverings etc. are all manufactured to a British Standard which specifies VOC, Formaldehyde and heavy metal content as appropriate.

65. Specify VOC free **water-based paints, rather than** solvent based paints to reduce volatile organic compound (VOC) emissions. Avoid paints containing heavy metals (i.e. lead, cadmium, and mercury). For further information refer to HSE Estates fact sheet: Specifying Healthy Healthcare Interiors for Capital Projects.

## 7.0 Energy Management in Healthcare Buildings = HSE Legal Obligation

Approximately 17% of the health sectors carbon foot print relates to **building energy consumption**. The National Energy Efficiency Action Plan (NEEAP) 2009 - 2020 sets a public sector **33% energy saving target by 2020**. The HSE must implement this target across the range of healthcare buildings, new builds, refurbishments, and existing buildings. For further information refer to the Health Technical Memorandum HTM 07-02 Encode.

66.  Since 2011 in accordance with S.I. 542 of 2009 the HSE are required to **report HSE energy performance** for all fuel types (electricity, thermal fuels and transport fuels (including fossil and renewable) directly to SEAI each year to track progress towards the 33% energy saving target by 2020 target.

67.  For electricity and natural gas, the HSE are required to **submit all meter numbers** to SEAI. The SEAI then access energy consumption data corresponding to HSE meter numbers directly from the regulated meter operators (ESB Networks; Meter Registration System Operator (MRSO) and Bord Gáis Networks). The HSE also self-report total energy consumption for all non-networks connected (e.g. heating oil's, Liquid Petroleum Gas (LPG) and diesel etc.) to SEAI.

68.  The HSE shall only **purchase or lease** a building, or a portion of a building, where the building has a Building Energy Rating (BER) equal to or better than: B3 and A3 (from 2015).

69.  In accordance with Energy Performance of Buildings Regulations (S.I. No. 243 of 2012) calculate a **Building Energy Rating (BER)** certificate for **any new HSE building with a gross internal floor area greater than 500m<sup>2</sup>**. The Non Domestic Energy Assessment Procedure (NEAP) calculations are used to determine the BER rating of the building. There are approximately 450 HSE buildings **with a gross internal floor area greater than 500m<sup>2</sup>**.

70.  The **Building Energy Rating (BER)** certificate of an existing building should be calculated based on the previous year's invoiced energy consumption, updated annually and displayed at reception. Refer to Energy Performance of Buildings Regulations S.I. No. 666 of 2006.

71.  For buildings with a gross internal floor area greater than 1000m<sup>2</sup> in accordance with Energy Performance of Buildings Regulations 2006, the energy efficiency of **Boilers and HVAC** (Heating Ventilation and Air Conditioning) should be tested on an annual basis. There are approximately 450 HSE buildings with a gross internal floor area greater than **1,000m<sup>2</sup>**.

72. Rooms should be heated at to a **healthy 20<sup>C</sup>**. Every 1<sup>C</sup> increase in heating above 20<sup>C</sup> represents approximately an 8% increase in heating consumption and costs. Generally heating to a temperature of 20<sup>C</sup> is acceptable with waiting rooms at 19<sup>C</sup>, corridors and stores at 16<sup>C</sup>.

73. Provide for on-going monitoring to **minimise energy consumption** within buildings. This should include continuous improvement against energy benchmark targets; (1 gigajoule (GJ) is equal to 277.7 kilowatt hours (kWh))

**Table 1 Delivered energy performance benchmarks (GJ / 100m<sup>3</sup>)**

Size/Type Healthcare	Good Practice New / Refurbishment	Good Practice Existing Buildings
Teaching & Specialist Hospitals	< 55	<65
General Acute Hospital	<52	<62
Community & Mental Health In Patient Facility	<40	<50
Health Centre/Clinic	<25	<35

(Reference Health Technical Memorandum 07-02: EnCO2de – Making Energy Work in Healthcare)

74. Avoid **ozone depleting** CFC (Chlorofluorocarbon) refrigerants in building's air conditioning, refrigeration, or heating systems. Hydrochlorofluorocarbons (HCFCs) refrigerants can be used but are being phased out. Similarly fluorinated greenhouse gases (F gases) are being phased out.



75. Energy Management Systems Standards (IS. EN 16001:2009 or ISO 50001:2011) ensure that energy management becomes integrated into organisational structures, to save energy, save costs and improve energy and business performance.

76. All HSE locations should refer to the **Sustainable Energy Authority of Ireland** for free information and energy map training on energy management [www.seai.ie/public](http://www.seai.ie/public)

## 8.0 Water Efficiency in Healthcare Buildings ☑ = HSE Legal Obligation

Healthcare facilities have to balance water conservation with maintaining infection control standards. The HSE spends over €8m per annum on water supply.

77. **Sub Meter and monitor** water consumption to reduce costs associated with water supply, and wastewater treatment. Dialysis, Sterile Services, Catering, Laundry, and Laboratories account for 30 per cent of acute hospital water consumption.

*Table 2 Water Usage Guidelines (Litres per Patient Bed Day). Courtesy of Thames Water UK.*

<b>Litres per Patient Bed Day</b>	<b>Acute Hospital</b>	<b>Long Stay Hospital</b>	<b>Long Stay Hospital</b>
	<b>&gt; 100 Beds</b>	<b>&gt; 25,000 Patient Bed Days per Year</b>	<b>&lt; 25,000 Patient Bed Days per Year</b>
<b>Good</b>	<b>&lt; 530</b>	<b>&lt; 330</b>	<b>&lt; 217</b>
<b>Average</b>	<b>530 – 700</b>	<b>330 – 411</b>	<b>217 – 297</b>
<b>Poor</b>	<b>700 – 1,137</b>	<b>411 – 689</b>	<b>297 – 379</b>

78. **Monitor water consumption**, flow, pressure and unaccounted for water (leakage) using sub-metering and data loggers to identify underground water leakage across the healthcare campus.

79. Incoming Local Authority **water pressure** should be between (between 2.2 Bar and 4.5 Bar). If water pressure is above 4.5 Bar consider installation of pressure reduction valves which will reduce water consumption.

80. Install **water conservation devices** in dual flush toilets, waterless or motion sensor urinals, taps, and showers which account for 20 per cent of acute hospital water usage.

## 8.1 Wastewater Discharge from Healthcare Buildings

81.  Waste water from HSE properties (with catering facilities particularly) should be licensed by Irish Water or the Local Authority under the Local Government Water Pollution Acts 1977. Wastewater effluent discharge to waters (stream, river, canal, lake, reservoir, or groundwater aquifer) greater than 5m<sup>3</sup>/day or population equivalent of 28 persons require a **waste water discharge license**. And wastewater effluent discharge to Local Authority urban sewage also requires a license.

82. Irish Water or the Local Authority waste water discharge license sets parameters (flow/volume, Biological Oxygen Demand, Oil Fats and Grease, and pH) relevant to the receiving waters or Local Authority waste water treatment plant for discharges to sewer.

83.  The HSE must register any HSE residential (where employees, mental health clients, or tenants live) property with a **septic tank** or waste water treatment system. Registration and inspection does not apply to HSE properties with a septic tank, but only partially occupied i.e. during working hours only. Refer to the Water Services (Amendment) Act 2012.

84. Healthcare buildings should not discharge **untreated wastewater** to a water body (stream, river, canal, lake, reservoir, or groundwater aquifer). Wastewater should be only be discharged (preferably to a Local Authority wastewater treatment system) with primary, secondary and tertiary treatment provided.

85.  Under sink **food waste macerators are banned** and should not be specified or installed in catering facilities. Refer to **S.I. No. 508 of 2009**. Specify and install **Oil Fat and Grease interceptors** for catering waste water discharge.

86. Specify and install **mineral oil interceptors** in vehicle parking areas and boiler drainage.

87. For further guidance refer to Health Technical Memorandum **HTM 07-04 Water Management and efficiency** for healthcare buildings.

## 9.0 Waste Management in Healthcare Buildings = HSE Legal Obligation

88. Specify sufficient internal and external waste storage space to facilitate segregation, and waste recycling. Specify a sufficient external **waste compound** for all healthcare waste including hazardous waste, risk (infectious) waste, and recyclable waste, food waste composting, and residual landfill waste.

89.  **Hazardous waste** that has the potential to cause harm to human health or the environment. Hazardous waste should not be landfilled. Common hazardous waste generated in healthcare facilities include:

<b>Electronic/ Electrical Equipment</b>	<b>Radioactive Waste</b>
<b>Batteries</b>	<b>Heavy Metal Equipment i.e. amalgam</b>
<b>Mercury / Fluorescent Tubes</b>	<b>Laboratory Chemicals / Waste Oils</b>
<b>Paints / Weed Killers</b>	<b>Asbestos</b>
<b>White Goods (Fridges etc.)</b>	<b>Healthcare Risk (Infectious) Waste</b>

90.  Dispose of hazardous waste using **an EPA Licensed hazardous waste contractor ONLY**. Maintain records of hazardous waste disposal i.e. Waste Transfer Form, EPA Waste License, and Certificate of Destruction for inspection.

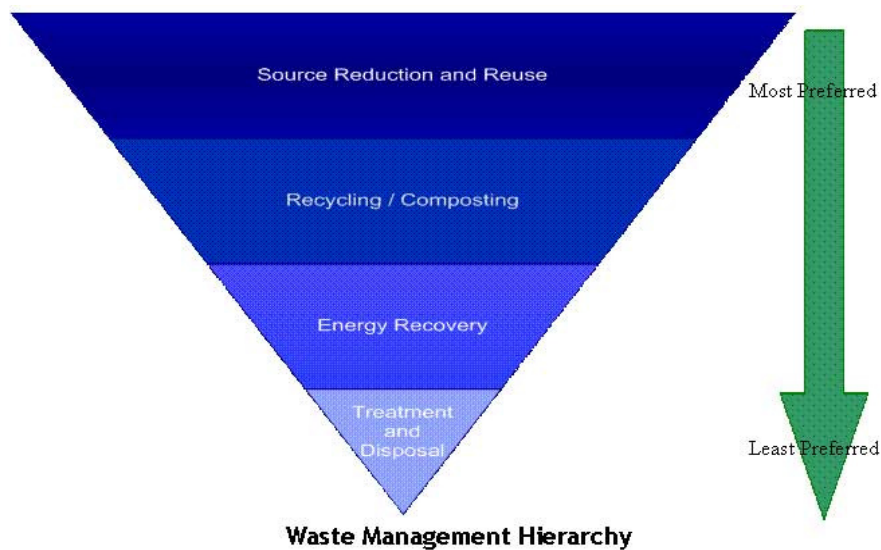
91.  HSE Waste should be transported by a **Waste contractor** with a waste collection permit, to an Environmental Protection Agency (EPA) licensed waste facility. Records tracking the movement of waste particularly hazardous waste should be available for inspection by Local Authorities, Health Information Quality Authority (HIQA), EPA or Health and Safety Authority (HSA).

92.  With regard to the procurement of electrical and electronic equipment, the HSE must verify whether a producer (supplier) is WEEE registered by obtaining a valid copy of the producer's current "Certificate of Registration" from the WEEE Register Society. Otherwise the supplier must be excluded from the procurement evaluation process. [www.weeeregister.ie](http://www.weeeregister.ie)

93.  Separate **bio-degradable** (food) waste for composting. Biodegradable waste must not be landfilled. Refer to **S.I. No. 508 of 2009** which applies to all HSE facilities where food is prepared / supplied to employees/patients.

94. Engage waste contractors on **a pay-by-weight or pay by volume basis** (rather than flat collection fee) to maximise waste reduction and recycling.

95. Facilitate the reduction of waste generated through reduction, segregation, recycling, composting, and energy recovery as appropriate in line with the government policy and the EU waste management hierarchy.



96. Consult the **HSE's Waste Awareness Handbook** published on National Healthcare Sustainability Office website ([www.hse.ie/sustainability](http://www.hse.ie/sustainability)) for further guidance.

## 10.0 Buildings Decommission

97. Prior to any HSE building being decommissioned, prepare a plan to ensure furniture, fittings and equipment fit for reuse are salvaged and redistributed.

98. **Read all utility meters** and apply to energy and water utility suppliers for meter disconnection as appropriate. Some HSE buildings may require low levels of heating despite being unoccupied, and therefore meters are not disconnected.

99. Relocate all **confidential records** and store or shred as appropriate.

100. Decommission underground and over ground **fuel tanks** as required to prevent soil and groundwater contamination.

## 11.0 References

1. The Green Guide for Health Care Version 2.2 January 2007  
<http://www.gghc.org>
2. American Society for Healthcare Engineering – Construction Guidance Statement Revision 2 <http://www.ashe.org>
3. Construction and Demolition Waste Management – A handbook for Contractors and Site Managers. Construction Industry Federation, Ireland. 2002
4. Comptroller and Auditor General's, value for money Report; Energy Management in the Health Service (1995).
5. Comptroller and Auditor General's, value for money Report; Waste Management in Hospitals (2005).
6. Government White Paper – Delivering a Sustainable Energy Future for Ireland – Energy Policy Framework 2007-2020.
7. NHS Estates <http://www.nhsestates.gov.uk>
8. Health Technical Memorandum 07-07 Sustainable health and social care buildings.
9. Health Technical Memorandum 07-02 Encode: Making Energy Work in Healthcare
10. Health Technical Memorandum 07-03 Transport management and car parking.
11. Health Technical Memorandum 07-04 Water Management and water efficiency.
12. Electricity Supply Board Sustainable development building guidance document for ESB
13. Refer to [www.greenhealthcare.ie](http://www.greenhealthcare.ie) for healthcare waste prevention guidance.
14. Green Public Procurement Action Plan, *Green Tenders* 2012.