VERSION 2 (JANUARY 2025)

CAPITAL & ESTATES

ENERGY EFFICIENT DESIGN

HSE Overview for Design Teams on EED Approach for Healthcare Buildings

Introduction

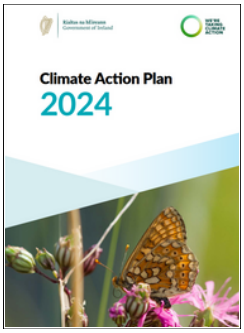
This document has been developed to support Design Team members in interpreting the HSE requirements and expectations surrounding the incorporation of Energy Efficient Design (EED) approach and principles into the project management process of all capital projects being undertaken on behalf of the HSE.

This document is a synopsis of the processes and responsibilities, whereas the definitive contractual requirements are outlined in the latest Technical Requirements and Scope of Services document and the Standard Conditions of Engagement for Consultancy Services (Technical) and Schedules A&B.

HSE Energy and Carbon Targets

The HSE, under the Energy Performance of Buildings Directive (EPBD), requires all new buildings to be 'nearly zero energy buildings' (NZEB) standard since 31 December 2018. Since the EPBD was published, the government has published the Climate Action Plan (CAP) 2021 (and subsequent updated versions) which sets out the National and Public Sector ambition to decarbonise the Irish economy.

The CAP requires the public sector to lead by example, and sets out the following requirements:

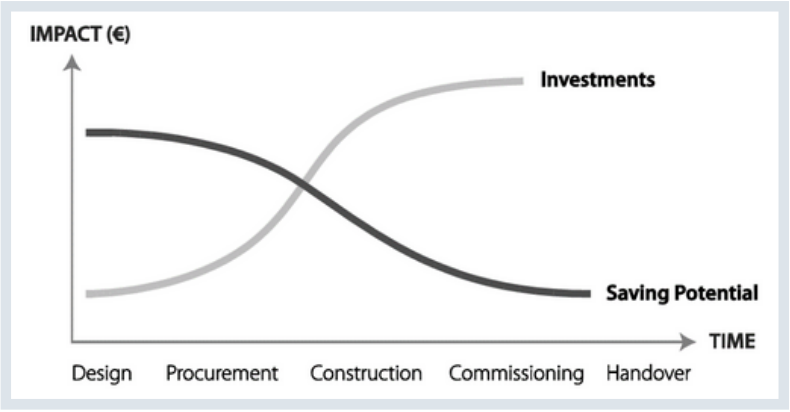


- 51% reduction in energy-related greenhouse gas (GHG) emissions and 51% reduction in thermal (heating and transport) related greenhouse gas emissions by 2030
- 50% improvement in energy efficiency by 2030
- Achieve carbon neutral no later than 2050.
- Not install heating systems that use fossil fuels after 2023, unless in the case of specific exceptions.
- Specify low carbon construction methods and low carbon cement material as far as practicable for directly procured or supported construction projects from 2023

To achieve these targets the HSE has set out requirements for all capital projects to adhere to Energy Efficient Design (EED) principles as set out in the HSE's Technical Requirements and Scope of Service document and the I.S. 399 Energy Efficient Design standard. The HSE have also included in the Technical Requirements and Scope of Service document the need for each Design Team to demonstrate the Projects route to Carbon Zero and that the design is Carbon Zero Ready.

Energy Efficient Design Process Overview

The greatest opportunity to reduce lifecycle energy and carbon is at the early design stages of new investments, with up to 95% of the lifetime operational carbon already committed at the end of the design process.



The EED process sets out how to ensure that energy efficiency and energy management considerations are built into the design process at an early stage when impact is most significant.

Energy Efficient Design Activities and Process Scheduling

The main EED processes which can form the basis of an EED checklist are shown in the table below. **Please refer to App 12 in the TR SOS for full set of requirements.**

HSE Capital Project	EED Process
Pre Project	• Half day training for DT members and targeted training for EED Facilitators
Stage (I) Preliminary Design	• Project Implementation Plan • Establishment of Project EED Objectives • Preliminary Energy Balance (updated throughout the design as the design progresses) • Challenge and Analyse Workshops with all Design Team participating • Energy Savings Register • DSM Modelling – Performance, natural Light and Overheating • Stage 1 EED Summary Report
Stage (II) A Scheme Design	• Challenge and Analyse Workshops with all Design Team participating • DSM Modelling – Performance, natural Light and Overheating - Issue Energy Savings Register • Stage 2 A EED Summary Report • Commence Design for Efficiency in operation & energy performance verification • Report on Climate Action Plan compliance and project design route to Net Carbon Zero
Stage (II) B Developed Design and Planning	• Developed Design to include EED measures incorporated • Stage 2 B EED Summary Report incorporating complete design including measures taken for ongoing energy management (DfEM). • Provisional BER Certificate • Part L Compliance Check + overheating analysis. • Report on Climate Action Plan compliance and project design route to Net Carbon Zero
Stage (II) C Detailed Design and Tender	• Final detailed specification to include EED recommendations incorporated
Stage (III) Tender Issue, Evaluation and Award	• Applicable EED elements included in Tender Documents • Assess EED included in tender response for appropriateness
Stage (IV) Construction	• Continual monitoring of implementation of EED to ensure the energy saving opportunities are properly implemented • Final BER Certificate as per EED Objectives
Stage (V) Commissioning and Handover	• Stage 5 EED Summary Report • Report on energy consumption achieved post occupancy, issue energy consumption report and DEC

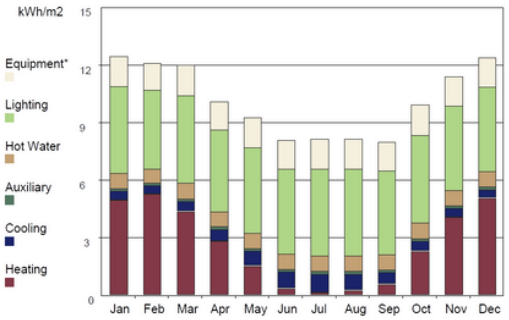
Energy Efficient Design Summary Report

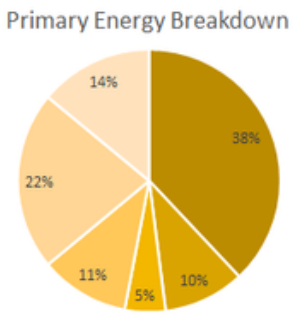
The EED Project Summary Report is a HSE EED document which must be completed and updated at specific stages of the project. The EED project summary report should capture the following:

- Introduction and Project-Specific EED Objectives
- Part L Compliance Declaration:
- Energy Data
- Create an Energy Balance Report
- Design for efficiency in operation
- Planning for energy performance verification
- Overheating Analysis
- Challenge & Analyse
- Register of Opportunities – Initial Register of Opportunities
- Register of Opportunities – Analysis of Opportunities
- Next Steps – Design Stage Reports
- Next Steps – Construction Stage
- Summary of Outcomes
- Commentary on lessons learned to date

Energy Balance Study

The Energy Balance Study (EBS) is an analysis of an asset's energy types, energy consumption, energy consumption profiles, energy costs and Significant Energy Users (SEUs). The EBS should represent 12 months of energy data and should have sufficient detail to illustrate the energy consumption profiles on a daily, weekly or monthly basis depending on the information available. The EBS should also identify the asset's energy users (heating, cooling, lighting etc.) and their respective energy consumption, with larger energy users categorised as Significant Energy Users. Where actual energy data is unavailable building modelling or the development of a BER can be used to generate the EBS. Note that the EBS must include all energy associated with the project including process related energy not just building fabric elements.





Challenge and Analyse

Once an asset's SEUs have been identified and the energy service requirements are known, they will undergo Challenge and Analyse (C&A) workshops. The purpose of C&A is to challenge and question the need for the energy service and the design of the systems which provide the service as well as the assumptions made in the design process. The SEUs will undergo analysis under each layer of the Energy Venn diagram. This involves considering what is the level of energy service required and can the energy service be eliminated or reduced; for essential services, what process is most suitable to provide the service; what equipment is most efficient and economical for the process; and how will the process be controlled, operated, maintained and managed. The C&A workshop should be attended by both the Design Team HSE representatives and the EED Facilitator. Do not forget to invite the owners of the process related energy to the C&A workshop.

Register of Opportunities / Energy Savings Register

The Energy Saving Register (ESR) is a concise summary of all energy related design opportunities which have been identified for a project or asset. These opportunities would typically arise from the earlier EBS and C&A exercises. The ESR will typically capture the most relevant project evaluation criteria such as energy, carbon and financial savings, project cost, simple payback, Net Present Value, Life Cycle Costing, risk and ease of implementation. These criteria provide a common language between professions and technical skillsets and allow the projects to be evaluated in a systematic and transparent manner and to facilitate a HSE investment decision. The ESR facilitates long term planning and multi-phase project planning, allowing asset owners to track previous progress, design decisions, and plan for future projects. As such the ESR should be maintained and updated throughout the project.

Generic opportunities must be avoided.
Opportunities must be project-specific and detailed.

Design for Efficiency in Operation / Energy Management / Performance Verification

The EED process should facilitate the long-term efficient operation and performance of energy systems. This is achieved through the early design consideration for how the systems will be operated, controlled, maintained and managed, and the variable conditions under which the systems may be required to operate. A particular element of this phase is the consideration of part load (as opposed to peak load) operation of plant and equipment and standby operation.

Design Modelling and Reports

Progress Dynamic Simulation Modelling of proposed design solutions at each design stage. Model building performance, Life Cycle carbon impacts, natural daylight, overheating and comfort levels prior to moving to the next design stage.

Reports to be prepared in HSE standard format (Guidance and standard format provided as part of the HSE's Technical Requirements and Scope of Service document. All modelling to be performed against future weather trends.

An **Energy Measurement Plan** should be developed to ensure SEUs are metered, and to allow for monitoring and reporting of energy uses, consumption, performance, efficiency and costs. This should take building regulations into account and ensure that energy related data is accessible to the end user.

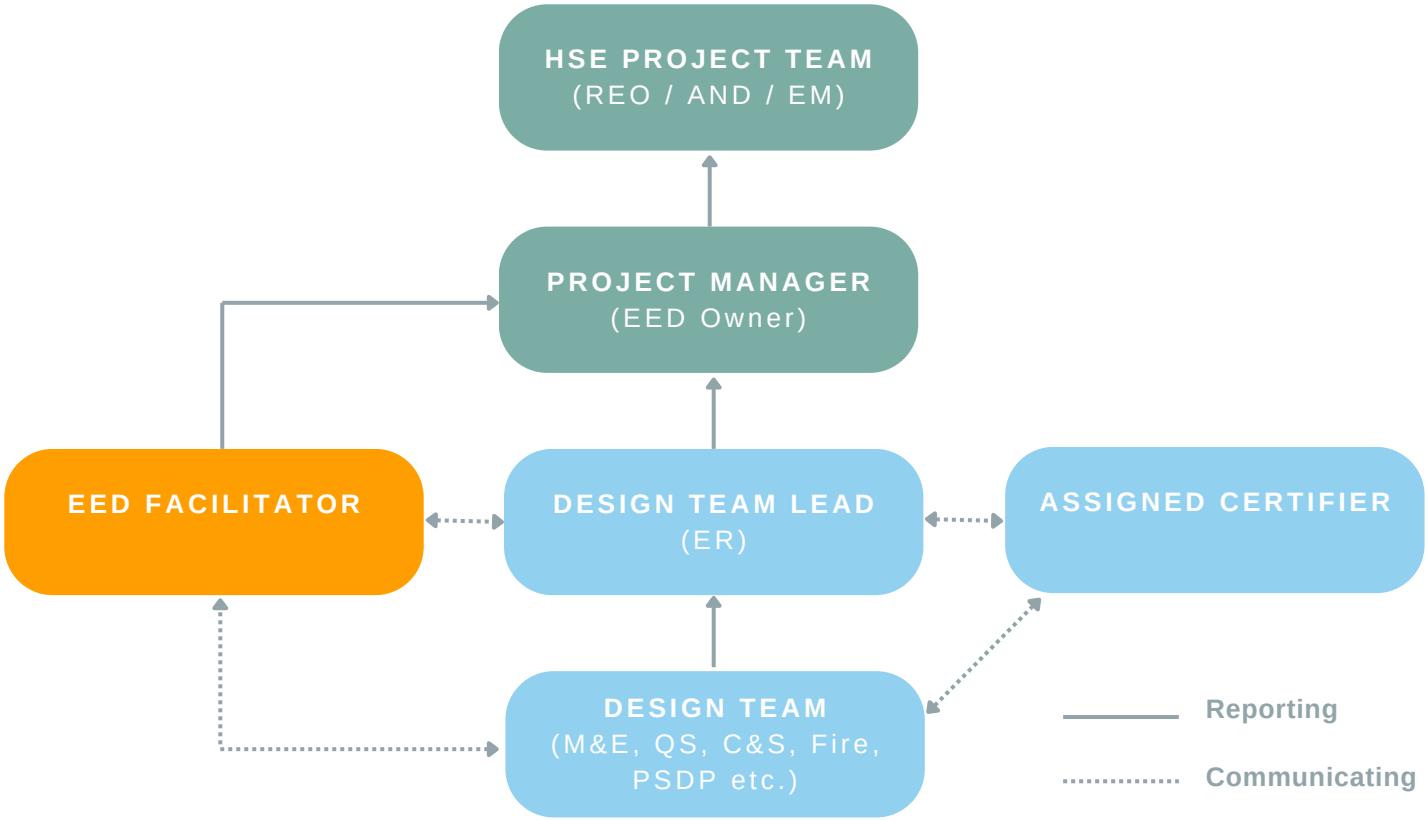
An **Energy Variables Review** should be carried out to identify variables (weather, occupancy, etc.) which may impact on energy performance. These energy variables can then be used for benchmarking and evaluating energy performance in operation and under varying operating conditions.

An **Energy Performance Deterioration Plan** should be developed to benchmark and verify ongoing energy consumption and performance against the design intent and the energy performance at commissioning.

A **Commissioning Plan** should be developed to ensure systems operate in line with the design intent, and EED requirements are achieved. O&M and commissioning information should be provided at project handover and include the energy efficient operation of the project. Standard Operating Procedures should be set out, controlled, and updated as appropriate, and specialist training needs identified for operators.

Roles and Responsibilities and Design Team Engagement

The EED framework sets out a clear project team structure, with both traditional project roles and dedicated EED roles. The structure ensures there are clearly defined roles and responsibilities, and effective reporting structures and communication lines are in place. The typical project team structure, along with reporting and communication lines is shown below.



Documentation

The current version of the **HSE's Technical Requirements and Scope of Services document and the Standard Conditions of Engagement for Consultancy Services (Technical) and Schedules A&B** will be issued by HSE Capital & Estates as part of tender documentation for each Project.

Requests for additional support and guidance can be made through the HSE Capital & Estates Sustainable Infrastructure Office - sustainable.infrastructure@hse.ie

Project Objectives

Capital projects completed under the HSE framework should achieve the following:

- Compliance with Building regulations and statutory requirements as a minimum
- High performing buildings with the least moving parts i.e. with systems which are user friendly, robust and appropriate in complexity to the skillset of those who will be operating them.
- Carbon neutral or carbon neutral ready.
- Designed for efficiency in opperation i.e. that energy use is metered, monitored and energy performance is maintained through the lifetime of the asset.

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