Health Sector energy management & 2030 decarbonisation planning

HSE Estates Energy Unit

Health Service Structure

7 Acute Hospital Groups

HSE Hospitals

Voluntary Hospitals

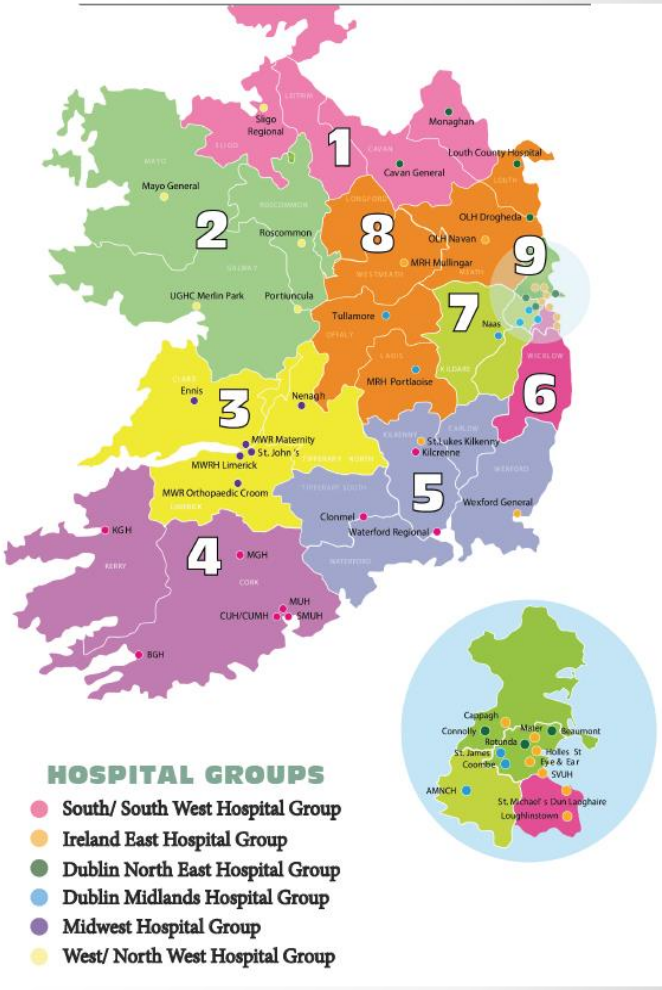
Health Service Executive (HSE) hospitals are owned and funded by the HSE.

Voluntary public hospitals receive most of their income from the State. Voluntary public hospitals are sometimes owned by private bodies, for example, religious orders.

9 Community Healthcare Organisations

CHOs are community healthcare services outside of acute hospitals, such as primary care, social care, mental health, and other health and well-being services.

These services are delivered through the HSE and its funded agencies to people in local communities, as close as possible to their homes.



HSE Estates

Part of HSE Shared Services - Health Business Services

4 Geographic Regions with 10 Regional Offices

Capital Projects

Manage Capital Plan (approx. €1.00Bn / annum)
Procure & deliver all Major & Minor capital Projects

Property Management

Manage Property Portfolio
Approx. 2500 properties Nationally
Over 3mill Metres Sq

Fire Safety

Manage Fire Safety advisory and control service

Health & Safety (Infrastructural Risk)

Provide guidance on best practice, design standards & regulatory guidelines

Energy & Sustainability

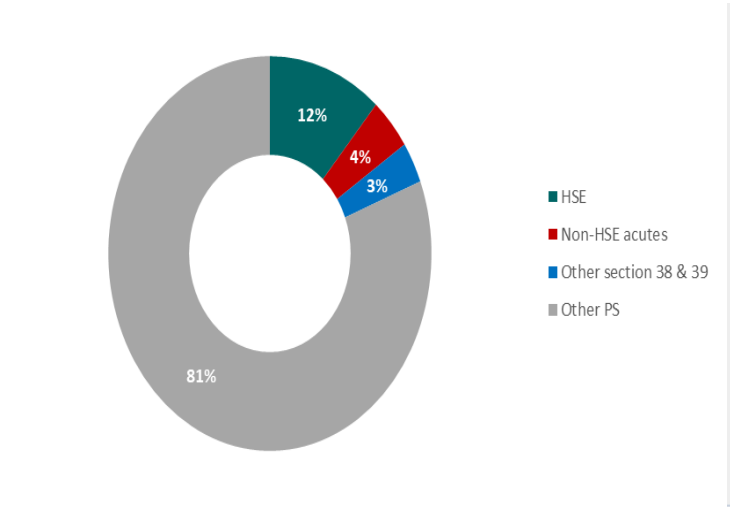
Manage & advise on Energy and Sustainability programmes within the Health Service

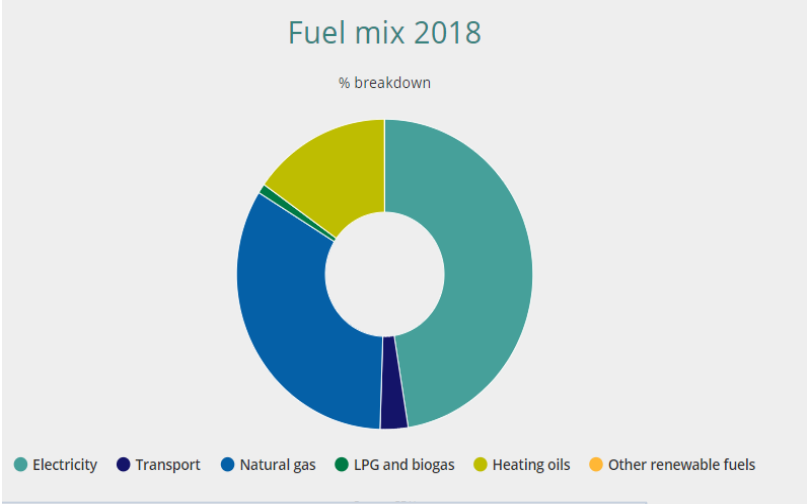
Maintenance

Provide maintenance services (directly in Dublin and Cork/Kerry Areas)

HSE & Acute Hospital Energy Use National Public 7371 GWh TFC

Health 1307 GWh 19% HSE 779 GWh Vol Acutes 329 GWh Vol Community 199 GWh





2018 Reporting Period
(last available verified data from SEAI)

Energy breakdown	Total Primary GWh	Percentage
Grid electricity	686	47%
Fossil Fuels	776	53%
Renewable energy	5	0%

Focus on Significant Energy Users
In HSE approx. 150 facilities account for 75% of usage

What have we done to date

1) Implemented an Energy Efficient Design Approach

2) Established Regional Energy Bureau – Energy teams & behavioural change (SEAI Support)

3) Progressed Register of Opportunities (ROOs) projects with SEAI support

4) Some pilot studies in Renewable Energy Sources

Energy Efficient Design (EED)

Embeds consideration of Energy from the start of new projects, minimising energy consumption through their lifecycle

- EED approach included in HSE **Design Team Scope of Services since 2016**
- Design Team must provide an **Independent Energy Expert** (IEE), aligned **to IS 399** as part of Design Team
- DT and IEE must **model** performance and provide stage reports to HSE Estates Manager
- Analysis and **Modelling based of future weather** trends and weather shift data
- HSE have developed a **Standard Format EED report for Design Teams** – standardised **comprehensive** approach across all project.
- Ongoing **Training & mentoring** for staff

Energy Efficient Design (EED)

TR AND SOS for Design Team Services (Traditional Building Works designed by Employer)
Appendix 10: Schedule of Project Deliverables

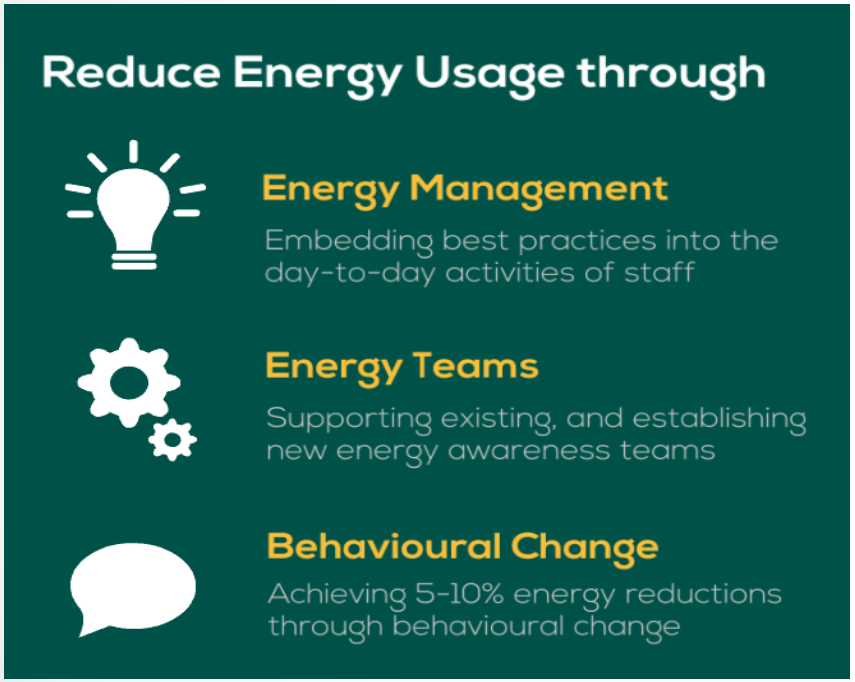
Stage (i): Preliminary Design:	Stage (ii) A: Scheme design:	Stage (ii)2 B: Developed Design & Planning:	Stage (ii) C: Detailed Design & Tender Documentation:	Stage (iii) Tender Issue, Evaluation & Award:	Stage (iv): Construction:	Stage (v): Handover and Final Account:
• Feasibility Cost Study; • Clarification of Client's Preliminary Brief and complete full design brief; • Management Control Plan; • Complete Project Energy Balance Report and EED Summary Report with recommendations as per EED IS 399:2014; • Budget Verification; • Site Studies and Site Appraisal and Report; • Preliminary H&S Plan (PSDP); • Stage (i) Report.	• Scheme design including Preliminary Floor Plans, Sections, Elevations. • Scheme design by Civil & Structural Consulting Engineers. • Scheme design by Building Services (M&E) Consulting Engineers. • Issue of Energy Saving Register (ESR) and EED Summary Report with recommendations as per EED IS 399:2014; • Commence DfEM as per EED IS 399:2014. • Obtaining determination in relation to SID status of project; • Elemental Cost Plan(s) on Scheme Design; • Stage (ii) A Report.	• Obtaining all necessary regulatory/statutory approvals complete including Request for Further Information (RFIs); • Procurement of any necessary specialist consultants; • Developed design including EED; • Outline Specification; • Continuous cost checking with a final cost check on the developed design; • Commencement of 'Per Cent for Arts Scheme'; • Room data sheets to include all equipment types (Groups 1, 2, 3 & 4); • Stage (ii) B Pre-Planning Report incorporating complete design reviews as part of DfEM. Reviews to consider operational phase, troubleshooting and Energy Factors Review; • Stage (ii) B Pre & Post Planning Reports with provisional BER Certificate. • Note: Design is frozen at the completion of this sub-	• Final detailed Specification; include EED Recommendations; • Completion of Tender documentation including Pricing Document; • Final Cost Check; • Pre-qualification of building contractor(s) including Design Team Report with clear recommendation in relation to pre-qualified building contractors; • Working drawings; • Stage (ii) C Report. • Pre-tender Report to include report on adequacy and completeness of tender documentation and budget and relevant changes to market conditions relating; report on programme.	• Issuing of Tender documentation including Health & Safety Plan where necessary and EED; • Tender Review and Report to include clear recommendation of most economical advantageous tender and cost comparison with budget cost; • Assess EED included in MEAT Tender; • Assess Contractors inspection notification framework and programme. • Preparation of contracts for signing.	• Issue of Commencement Notice • Client Progress Reports to include cost report, programme and contractual implications at monthly or agreed intervals; • Interim Payment Recommendations / Certificates at monthly or agreed intervals; • Site visits and inspections at reasonable and required intervals; • Continual monitoring of implementation of EED to support efficient achievement of Client required BER rating; • Ensure the energy saving opportunities identified and agreed as part of the ESR are properly implemented; • Certificates of Compliance with Planning Consent and Certificate at completion (Building Regulations) BER Certificate and registration on the building on the control register; • Achieve Substantial	• Inspection of the Works; production of comprehensive snag list; supervision of satisfactory completion of the Works; • Draft Final Account; • Final Account; • Final Payment Recommendation / Certification; • Receipt from building contractor the complete Safety File which shall include 'As-Built' drawings (to include building and service installations) and Operation and Maintenance manuals including validation of same; • Report to and advise the Client on insurances; • Formal hand-over of Works to the Client; • Report on energy consumption achieved post occupancy; issue energy consumption report and DEC.

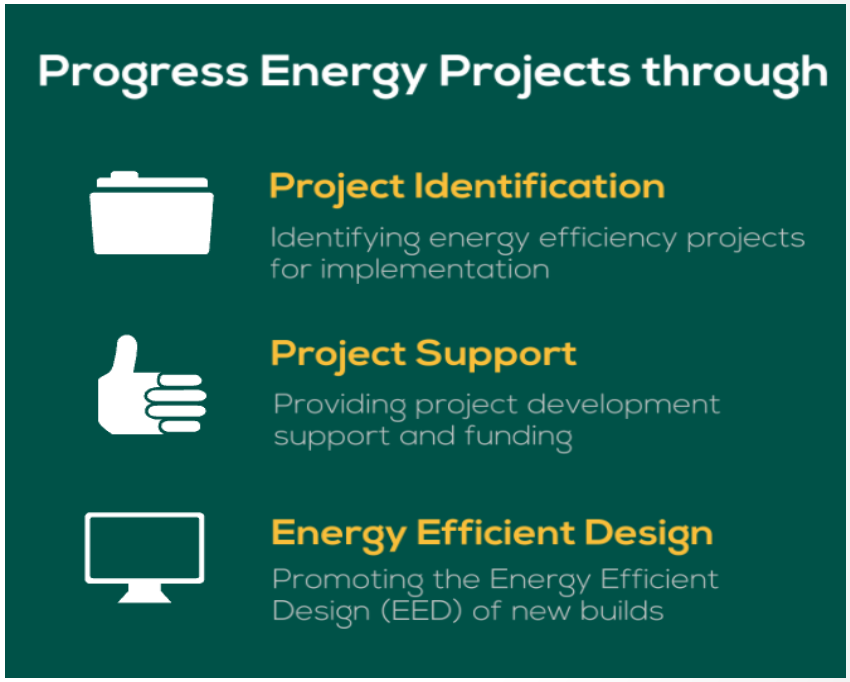
Energy Bureau Energy Teams

- **3 Regional Bureaus established by HSE Estates, in partnership with SEAI, to assist Healthcare Facilities achieve Energy & Climate Targets**
- **Embedded in HSE Estates Offices (with Dedicated Energy Officers)**
- **Energy Teams** are now in place in **HSE top 100 Locations**
- **75% of Usage - Establish/Reinvigorate**
- Supporting Energy Teams in in **10 of 16 Vol. Acute** Hospitals
- Supporting Energy Teams in **10 of 20 Top Vol. Community**
- ***Supporting OPW Optimising Power at Work*** *and Green Healthcare Programme (water conservation)*

Estates Energy Bureau

Regional Energy Bureaus and Energy Teams – what they do





Behavioural Change 6.85% saving East Pilot

26% reduction in Energy Usage since baseline 2009

Works – Register of Opportunities

Assessment and Prioritisation tool developed in 2018 aligned with SEAI criteria **KWh Saved - CO2 Reduction - Payback - Disruption**

Jointly funded with SEAI to progress Shallow retrofit Works

€3.00m spend in 2019
€3.50m spend in 2020

2019	Investment €3.0m	Avoided CO2 4.64m tonnes	Savings €1.2m	Payback 2.54 yr

Summary Impacts to date

East Bureau Pilot Project 2018

- Energy Reduction of 12,004 Mwh
- Saving of **6.85 %** for the Region
- Achieved mainly through behavioural change

Energy Project Savings 2019

- Investment of **€3.0 mill**
- Lighting, Boiler upgrades, Insulation, Pumps, BMS & Controls
- Energy Reduction of 13,788 Mwh
- 4.64 million tonnes of avoided CO_2
- Savings of €1.2m, payback 2.54 years

Progress to 2020

- As of **2019** for the HSE
- Achieving 7.5% – 10 % Behavioural Change
- **Reduction in Energy use of 26%** against a **target of achieving 33%** reduction by 2020.

Pilot Studies Renewable Project

1. Heat Pump (Air Sourced and LPG)

- St Josephs (Autumn & Sunset Lodge) Longford (ASHP)
- St Anne's Caherciveen (ASHP)
- St John's Enniscorthy (LPG)

2. Biomass

- Ofalia House – Biomass / LPG
- St John's Enniscorthy
- St Patrick
- Fermoy Community Hospital

3. Solar

- Solar PV – St Mary's Hospital (Phoenix Park)
- SWH – Phoenix Care Centre

Challenges & Limitations – HSE Pilots

The challenges and limitations of the various pilot seen to date

Biomass

- Security of Supply – Long Term supply contracts for biomass fuel
- Space and storage
- Licensing and Waste Disposal – Biomass as identified as "Process Waste" under EU Waste Directive
- Health Impacts i.e. Air Quality and Particulate Matter (PM) of biomass

ASHP

- Low grade heat
- Legionella concerns due to operating temperature
- Supplementary (fossil fuel) plant critical for legionella control & management.
- For plant replacement programme on Older buildings only suitable if installed in conjunction with building envelope upgrade works

PV Solar

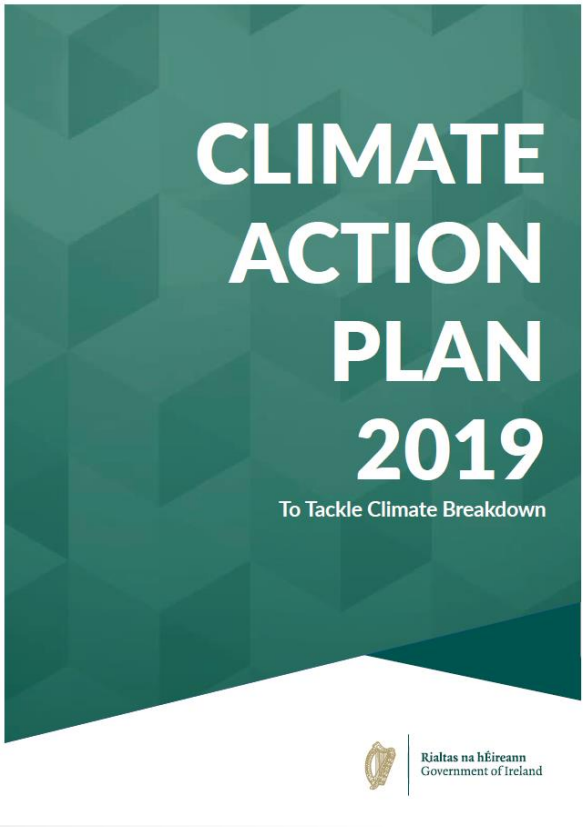
.

- Limited by available roof space
- Multi story building roof space to floor area ratio is low
- competing requirement for ventilation and a/c plant on the roof to meet clinical needs

Solar Water Heating

- Limited by available roof space
- Variable product quality (Leads to high maintenance costs)
- Average water temperatures can be low resulting in a potential issues regarding legionella control and management.
- Actual performance of some system can significantly less than the design capacity

Post 2020 Targets



2030 Targets
2050 Targets
Legislative Obligations
National Development Plan

B2 BER
30% (50%) Carbon Reduction
50% Energy Efficiency

(absolute targets, not adjusted for activity)

What are we going to do?

Energy Efficient Design

Essential – **Continue**
Ongoing training & mentoring

Energy Bureau

Ongoing / **Expand** to Section 38 /39 agencies
Commenced 2020, continue Q1 2021
2 additional Energy Officers to progress

ROO Shallow Retrofits

Continue development of ROO
Complete works through HSE / SEAI MOU

Develop Decarbonisation Strategy & Action Plan (Q1 2021)

Develop Decarbonisation Strategy & Action Plan (Q1 2021)

1 Develop a decarbonisation Model which will:

A) Identify for existing building stock where we are at & where we need to get

B) Model the Impact of any actions/works on the output/outurn

2 Engage Technical Advisors + Design Teams to progress 10 pilot pathfinder projects

Selecting 10 nationally with a service type mix

- Acutes

- Community/Residential/Older Persons /Mental Health/Dissabilities

- Primary Care/Day Services/Office

Pilot Pathfinder Objectives

- Inform what existing performance of 10 buildings
- What need to do to get a B rating
- What need to do to achieve Energy and CO^2 target
- Develop design to Stage 1 with Costs
- Identify gaps in available technology
- Incorporate learning to date (Biomass Pilot, PV Pilot, Heat Pump Pilot) into Technical Advisor led Project
- Feed into info sharing forum on R&D, re technology – SEAI, Pathfinder Programmes, Other Public Sector, NHS etc etc
- Identify what role EPC can play (managed guaranteed maintenance contract for active systems)
- Progress all works in smaller units and first phases at larger units
- Feed into HSE Decarbonisation model and upscale to top 150 HSE/Health buildings
- Assist in development of business cases for funding to progress top 150* locations

The task ahead – Scale and Other factors

B2 Rating

- B BER - over 3million Msq Buildings portfolio- €3bn plus in less than 10 years (approx €400m/annum)
- 40% increase in HSE existing Capital programme
- Engaged with Dept health and DPER NDP review

CO2 Target

- 50% CO^2 reduction - HSE 240 ktCO2 - 120 ktCO2 reduction
- Less grid decarbonisation leaves a reduction target of 87 ktCO2

However !!

- **Existing HSE Capital Programme**

Additionally

- **54 No. Community Nursing Units** (2025) - approx 270,000m2
- A3 BER - nZEB Compliance
- Net Carbon Emissions after decarbonisation of electrical grid **5,371 tonnes CO2/annum**

- **105 Primary Care Centres** - approximately 340,000m2
- A3 BER - nZEB Compliance
- Net Carbon Emissions after de-carbonisation of electrical grid **6,805 tonnes CO2/annum**

- **Project Ireland 2040 - Slaintecare**

- **2,600 additional beds (2030)** - approximately 250,000 m2
- Additional 50% allowance for other Slaintecare stated requirements
- A3 BER - nZEB Compliance
- Net Carbon Emissions after decarbonisation of electrical grid **13,481 tonnes CO2/annum**

Absolute targets

- Absolute Carbon Reduction targets -reduce carbon emissions against a static baseline figure
- **No allowance/adjustment for activity** or increases in services
- 2009 – 2018: Inpatients increased 7%, Day Cases increased 27%, Outpatients 43%- **Net 25% Increase**

Workstreams