CUH

Ospidéal Ollscoile Chorcaí
Cork University Hospital

Green-Campus Programme

Re-assessment

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

seeco
Sustainable Healthcare & Living

Table of Contents

1 Introduction 5
1.1 Mission Statement 5
1.2 CUH Campus Staffing 5
1.3 CUH Campus Patient Activity since 2014 6
1.4 Background to Environmental Management on campus 6
1.5 CUH Campus "seeco" Programme 6
1.6 Corporate Arrangements 7
1.7 Adult Acute Mental Health Unit 8
1.8 Relevant groups on CUH campus 9
1.9 Aerial View of CUH Campus Today 10
1.10 Legislation 10
1.11 Background & Timeline for Green Campus 11
1.12 Significant Opportunities /Challenges with the Green Campus Programme 11
2 Green Campus Committee 13
2.1 Organisational Framework for Achieving a Sustainable Environment 13
2.2 Role/purpose: 13
2.3 Function/Objective 13
2.4 Membership 14
2.5 Frequency of Meetings 15
2.6 Authority 15
2.7 Communication Protocol 16
2.8 Reporting Responsibilities & Communication 16
2.9 Green Teams & Green Advocates Network 18
2.10 Green Advocates 18
3 Environmental Review 20
3.1 Introduction 20
3.2 Maintenance Theme – Energy 21
3.3 Lighting project 2017 26
3.4 Building Sustainability Evolution: 28
3.5 Energy Conclusion 30
3.6 Maintenance Theme- Waste 30
3.7 Main Theme-Transport 37
3.8 Main Theme-Water 45
3.9 Emergency Department (ED) 56
3.10 Main Theme-Biodiversity 61

4 Action Plan 71
4.1 Action Plan 2017 72
4.2 Action Plan 2014 82
4.3 Action plan 2015 92
4.4 Action plan 2016 100
5 Monitoring and Evaluation 105
5.1 Process/Practices 105
5.2 Objectives Evaluation & Benchmarking 105
5.3 Energy and Gas consumption 108
5.4 Water monitoring and evaluation 110
5.5 Waste Monitoring and Evaluation 119
5.6 Transport Monitoring and Evaluation 123
5.7 Biodiversity, Monitoring and Evaluation 126
6 Chapter 6 - Links to Learning 131
6.1 The CUH Group and UCC will: 131
6.2 Staff 132
6.3 Green advocates 132
6.4 Students 132
6.5 Patients, Visitors & Public 132
6.6 Campus Bike Week 133
6.7 CUH Campus Student Led Project 133
6.8 CUH/UCC 133
6.9 CUH Green Agenda and UCC 134
6.10 CUH student survey 2018 134
7 Informing staff and involving campus and wider community 135
7.1 Introduction 135
7.2 Partnerships and Collaborations 135
7.3 Sustainable Healthcare Change programme 135
7.4 Sustainability external events 135
7.5 National Health Sustainability Office 136
7.6 OPW Energy Awareness Campaign 136
7.7 Energy Awareness day 7th November 2017 136
7.8 Clean Technology Centre 137
7.9 Transport Mobility Forum (TMF) 137
7.10 Churchfield Community Trust 137
7.11 ART booklet and wider community 138
7.12 Staff/ Student Engagement 139

7.13 Green campus notice board 140
7.14 Sustainable Green Campus Website Page 140
7.15 Haiti Orphanage Project 140
8 Green Charter 141
8.1 Introduction 141
8.2 Energy targets 142
8.3 Energy Actions 142
8.4 Energy ICT Actions 142
8.5 Water targets 142
8.6 Water actions 142
8.7 Waste Targets 143
8.8 Waste Recycling Actions 143
8.9 Waste management actions 143
8.10 Transport and travel targets 143
8.11 Travel and transport actions 143
8.12 Biodiversity Targets 144
8.13 Biodiversity Actions 144
8.14 Sustainable Healthcare Targets 144
8.15 Sustainable Healthcare Actions 144
8.16 Self-Management 144
9 Conclusion 145
10 Appendices 147
10.1 Agenda and Minutes of Sustainable Healthcare Steering Group 148
10.2 Waste Audit Checklist 152
10.3 Nursing Student Survey 154
10.4 Bin Location guidance 156

1 Introduction

Cork University Hospital (CUH) is the main regional tertiary centre for Cork and Kerry. It is the largest university teaching hospital in Ireland and is the only Level 1 Trauma centre in the country due to the presence of over 40 different medical and surgical specialties on the campus. The campus consists of Cork University Hospital & Cork University Maternity Hospital (CUMH). CUH is the principal teaching hospital attached to the School of Medicine, University College Cork (UCC). The CUH campus also includes UCCs Clinical Research facilities, and other education facilities. The University College Dental School and Hospital for undergraduates' is located in the grounds of Cork University Hospital, which is managed by University College Cork.

For further information please visit:

http://www.cuh.hse.ie/ and http://www.ucc.ie/en/greencampus/

1.1 Mission Statement

The Cork University Hospital group is committed to providing high quality care for those we serve with a focus on clinical excellence, patient safety and continuous improvement through clinical education and research.

1.2 CUH Campus Staffing

The following table outlines the whole time equivalent staff at Cork University Hospital campus comparing 2014 to 2017.

Figure 1-1

Grade	Overview	2014	2017
Staff		3297	3232
Students		407	439
	Student Breakdown	2014	2017
Medical	INTERN	46	48
	REGISTRAR	61	95.71
	SENIOR HOUSE OFFICER	106	124
	SENIOR REGISTRAR	3	3
	SPECIALIST REGISTRAR	73	92
	NCHD Total	291	363
Nursing	STUDENT NURSE (DEGREE STUDENT)	66	30
	PRE REGISTRATION STUDENT MIDWIFE	23	10
	PUPIL MIDWIFE	26	22
	Nursing Students Total	114	61
Other	PHARMACY STUDENT	1.00	1.00
	STUDENT PHARMACEUTICAL TECH	0.66	13.00
	Other Students Total	1.66	14.00

1.3 CUH Campus Patient Activity since 2014

As can be seen in the following table, patient activity at CUH has been increasing since 2014:

Figure 1-2

CUH& CUMH	2014	2015	2016	2017
Day case	24493	24605	26581	27541
Inpatient	47847	45861	45944	50941
Emergency Attendances	78804	79465	80066	80672
Out Patients	436973	445141	446945	461044
Births	8031	8011	7616	7500

1.4 Background to Environmental Management on campus

At the 2010 Foundation for Environmental Education General Assembly in China it was deemed that once a hospital was affiliated to a University it can be considered a third level teaching environment and therefore eligible to participate in the Green- Campus Programme. The university to which the hospital is affiliated must be registered on the Green-Campus programme. Environmental management on the campus is incorporated into the management structure and is a shared responsibility across CUH campus. This function is supported by the Health Services Executive (HSE) Estate's. Since 2013 CUH campus in collaboration with HSE South Estates is working in partnership with Sustainable Energy Authority of Ireland (SEAI) in achieving sustainable environmental set targets and objectives.

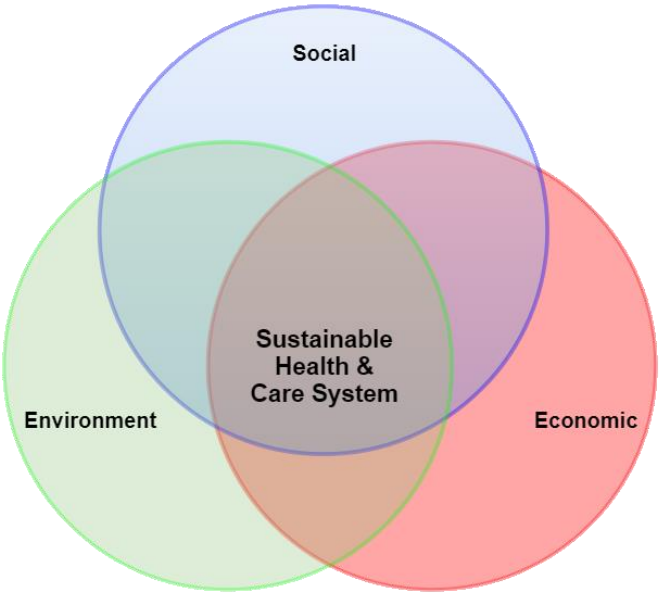
1.5 CUH Campus "seeco" Programme

In order to make the Sustainability Programme instantly recognisable to the staff, a unique brand was developed for the awareness campaign in partnership with BA Visual Communications at CIT. The seeco Programme at Cork University Campus is a sustainable healthcare and living awareness campaign. seeco '' stands for lasting social, environmental and economic sustainable change. It is about energy use, water use and the disposal of waste and waste water and sustainable healthcare. Being visible socially to the hospital and community on our projects, we have social responsibilities with how we use water and energy and how we produce and handle waste.

seeco intends to inform and inspire staff to become more energy efficient and adopt and promote a low carbon lifestyle, at work and at home. As well as 'greening' the hospital sustainable healthcare includes adapting how we deliver services, promote health and

wellbeing, corporate social responsibility and developing more sustainable models of healthcare.

Figure 1-3 Complementary Relationships of Sustainability Pillars & Sustainable Health & Care Systems



1.6 Corporate Arrangements

Various responsibilities in relation to environmental management on the CUH campus are outlined hereunder.

HSE Estates is responsible for maximising the value of HSE properties and facilities, to ensure that appropriate infrastructure is in place when and where required in order to enhance patient, client and staff wellbeing, by managing the organizations €10 billion capital infrastructure and annual capital plan

- The Corporate Estates Office develops protocols, policies and strategies; provides advice and support to the local Estates Offices and the non-HSE agencies; manages national programmes and particular projects (NPH, CMH and others); and liaises with the HSE senior management, the Department of Health and other external agencies and bodies on these and other issues.
- In mid-2013 the HSE established a National Health Sustainability Office (NHSO) which is acting as a central focal point for all health sustainability issues and building strong relationships with the Environmental Protection Agency, the Sustainable Energy Authority of Ireland, the Office of Government Procurement, the Office of Public Works and the Department of Communications, Climate Action and Environment.

- The HSE South Estate Manager manages the delivery of all infrastructure related services in the South of Ireland including CUH. This includes management of Capital Projects, Property Management, Fire Safety, Health & Safety (Infrastructural Risk), Environmental Services (Water, Waste, Energy, etc), Maintenance and technical support to Service Managers.
- The HSE Procurement Department is responsible for the procurement of goods for the hospital in accordance with EU procurement directives, government guidelines and internal policies and procedures. The Purchasing Section of CUH provides a purchasing service for a range of goods and services to the CUH Group. The structure includes purchasing, inventory, logistics, customer services and accounts payable

1.7 Adult Acute Mental Health Unit

Figure 1-4 The newest building to be added to the CUH campus opened in 2015

The purpose-built 50-bed South Lee Mental Health Services Unit (SLMHSU) on the CUH campus is airy, bright, roomy, and full of nuanced design features, from broad corridors with bevelled walls to negate the "straight line" look, to seven nicely landscaped outdoor interior garden spaces, to a "wander loop" for elderly patients whose diminished hold on reality can send them wandering without realising where they are.

The loop also encompasses a garden space and, because security is paramount, it is surrounded by glass. In fact, glass is a feature throughout the building, including at the ends of corridors, creating a sense of continuous flow, which helps in reducing any sense of claustrophobia, says Mental Health Minister Kathleen Lynch.

1.8 Relevant groups on CUH campus

Figure 1-5

Group	Description	Student Representation
Sustainable Healthcare Steering Group	The Sustainable Healthcare Steering Group has an environmental purpose on identifying issues with waste, water, energy and transport along with evaluating, monitoring and implementing environmental strategies.	✓
Camera Club	The camera club meets monthly.	✓
Arts Committee	The Arts Committee was set up in 2000 it has grown over the years with different projects and expeditions' being rolled out throughout the year.	✓
CUH Scrubs Choir	The hospital choir was set up in 2013 and has members from all disciplines. It engages in regular community events representing the hospital.	
Smoking Cessation Group	This multidisciplinary group implement the smoke free campus while also advising staff and patients on quitting.	
Hygiene Team	The Hygiene team focuses on all services throughout the hospital in delivering the most efficient services for patients care.	
Nutritional Guidelines	The nutritional guidelines group focuses on patient nutrition from field to fork and how to improve the patients dietary need while in hospital	
Safety and Infrastructural Risk Team	The Safety and Infrastructure risk group, reviews risk assessments associated with infrastructure.	
Infection Prevention and Control Committee	The Committee is under infection control governance. Managing all issues including infection prevention. All environmental hygiene audits, including waste are reported to this group.	
Hygiene Auditors Group	This group audits a department weekly and reviews the standards associated with the process.	
Green Advocates	This group is made up of in house staff members that are the sustainability initiatives eyes and ears on the ground. The group meets 4 times a year.	✓

1.9 Aerial View of CUH Campus Today

Figure 1-6

Google Maps Link:

Figure 1-7

https://maps.google.co.uk/maps?safe=active&ie=UTF-8&q=cork+university+hospital&fb=1&gl=uk&hq=cork+university+hospital&cid=9140081204599369637&ei=dQHdUtr2K4SUhQfP1oCwBg&ved=0CCQQtgMwAA

1.10 Legislation

Cork University Hospital has statuary obligations with regard to:

- **Energy:** monitoring and display energy certificates.
- **Waste management:** hazardous, clinical and municipal wastes.

- **Water management:** use and wastewater discharges.
- **Air:** emissions to air and mitigation measures.
- **Transport:** any transport or travel statutes/conditions that need to be

1.11 Background & Timeline for Green Campus

In 2010, UCC became the first 3rd level educational institution in the world to be accredited with the international Green-Campus Award. Dr Ken Walsh CUH Consultant Anaesthetist was inspired after successfully piloting a mixed dry recycling initiative in a CUH operating theatre. The recycling programme was subsequently rolled out across the hospital (2008-09). Dr Walsh contact An Taisce to see if CUH could participate in the Green–Campus Programme and submitted an application for a Green Flag.

The question was 'could it be done in an acute healthcare facility'. At the 2010 Foundation for Environmental Education General Assembly in China it was deemed that once a hospital was affiliated to a University it can be considered a third level teaching environment and therefore eligible to participate in the Green- Campus Programme. In 2014 CUH was awarded the Green Flag for Energy and Waste. Sustainable healthcare was born in CUH and it has hugely grown since 2014. CUH are now going for re-assessment in 2018 under new themes; Water, Bio-diversity and Transport with Waste and Energy as maintenance themes. CUH was due to be reassessed in 2017, however due to the gap in the Sustainable Environment Officers position this was not possible. At all times the hospital remained in contact with An Taisce and kept them informed of developments.

1.12 Significant Opportunities /Challenges with the Green Campus Programme

Opportunities

- Actively promoting the links to sustainable healthcare and the environment, sharing the CUH journey with Global Green Healthy Hospitals and Other hospitals applying for the Green Flag.
- Creating community partnerships with OPW, OGP and CUH charities office to collaborate on environmental projects that will raise the profile of sustainable healthcare.
- Art as community engagement, launch of the art booklet engaging patients and visitors in the work created through experience. The art coordinator is working on various sustainability projects such as outpatient's art wall and Crutch art for internal outdoor spaces.

Challenges

- Engaging front line staff in clinical areas with huge pressure in delivery of patient care, the commitment to sustainability can be forgotten and left behind.
- Recycling on campus, difficulty with staff behaviour in all areas of the hospital leading to contamination of recycling bags. This can again be down to behaviour and pressure of patient care.
- Healthcare Risk Waste Reductions, this waste stream is the most complex and costly waste in the hospital. CUH would like to see this waste reduced in line with the EPA benchmark of 1.9kg per patient bed day.
- Reaching the energy target reduction of 8% by the end of 2018, while also achieving the 33% improvement in energy efficiency by 2020.

2 Green Campus Committee

2.1 Organisational Framework for Achieving a Sustainable Environment

The governance structure in CUH is based on multi-disciplinary team work. With an Executive Management Board (EMB), 4 Clinical Directors and 4 Clinical Directorates there is a corporate commitment to continuous quality improvement in patient service and sustainable healthcare.

Arrangements are in place to incorporate and formalise sustainable healthcare and living into the four Clinical Directorates. It is anticipated that the sustainability link will strengthen as the Directorate structure, recently introduced, is consolidated within the organization.

2.2 Role/purpose:

The Cork University Hospital (CUH) Group Sustainable Healthcare Environment Steering Group purpose is to:

- Reduce energy, waste and water disposal costs on the CUH campus.
- Encourage smarter travel, cycling walking and the use of public transport whilst reducing the traffic congestion.
- Encourage internal garden groups and external bio-diversity on campus.
- Implement the National Energy Efficiency Plan & the HSE towards Sustainability Strategy for Health 2017 to 2019 by reducing energy consumption by 5% in 2019 with an overall goal of 33% improvement in energy efficiency by 2020.
- Advise on the direction, coordination and implementation HSE Sustainability Management Strategies 2013 to 2017 across Cork University Hospital campus;
- Monitor progress and ensure adherence to local and HSE Sustainability Management Strategies, targets and objectives.
- Achieving national/ international recognition as a sustainable healthcare organization.
- Structure of the group changed in 2017 after a 6 months break on meeting due to resource. The CEO decided on new members.

2.3 Function/Objective

- The committee identify targets for energy and waste for CUH campus for the year ahead, with three new themes included.
- New themes discussed with the committee, and agreed that re-assessment themes would be Water, Transport and Bio-diversity. The decision to take

these new themes was the progress that the campus has made under each theme over the last 12 months.

- Monitor and evaluate at each meeting the progress made on all themes, this involves monitoring costs, consumptions, tonnages, KWh with maintenance and estates in order to feed back to the group.
- Receive regular reports for individual on relevant responsibilities in relation to green awareness campaigns, energy, waste, water costs and consumptions.
- Regularly review the transport as per tax saver, smarter travel workplaces initiatives, cycling campaigns, from management plans, mobility management plans and staff surveys conducted.
- Individuals may include HSE Estates South, the Regional Energy Champion, Engineering Officer CUH, Services Manager and Sustainable Environment Officer.
- The Steering Group in collaboration with HSE South Estates will review relevant Energy & Saving Project for funding approval, award and implementation;
- Review any proposed new or updated Strategy, Policies, and Procedures, Protocols and Guidelines and relevant staff communication in accordance with HSE / HIQA standards, CUHG guidance, evidence-based best practice and legislation;
- Seek specialist advice where appropriate;
- Evaluate and monitor the programme regularly.

2.4 Membership

The chair of the Sustainability Healthcare Environment Steering Group is appointed by the Senior Management Group for a two year term of office and is accountable for all aspects of the group's work. Group members are chosen for their knowledge, skills and abilities including the ability to represent relevant interests. Group membership will be reviewed annually to ensure on-going appropriateness and representation. The group had not met between November 16 and June 17 due to the Sustainable environment post being vacant for this period. When the post was taken up in April 2017, the CEO invited new members to the group and it reconvened in July 2017.

Figure 2-1 Green Campus Committee Membership

Chair	Tony McNamara CEO
Co-Chair	Marie J McCarthy Services Manager
Advisory board	John Kingston
Maintenance	Patrick J Murphy Engineering Officer
Nursing Representation	Ann Moran NPHD
Security	Donal McCarthy Head of Security
Bio-Medical Engineering Representative	John Bohane
Sustainable Environment Officer	Aoife O Connell
HSE Estates	Kieran Twomey/James O Halloran
UCC	Maria Kirrane UCC Sustainability Manager
Portering Representative	Finbarr Buckley
UCC Student Body Representative	Laura Mitchell
CUH Nursing Students	Megan Buckley, Michelle Kiely
Internal or external persons may be invited to attend meetings at the request of the Chairperson on behalf of the Group to provide advice and assistance where necessary.	

Student Recruitment - Students are employed or on placement at CUH from various government employment schemes and training agencies; and various Cork City educational institutions. All students are treated as staff members. They receive induction and orientation on initial assignment within CUH by the relevant discipline/department. At the induction session information and an invitation is issued to participate and join the Green Advocate network or become a member of a Green Team or Steering Group.

2.5 Frequency of Meetings

The meetings were held every two months up until November 2016. The sustainable healthcare steering group had not met between November 16 and June 17 due to the Sustainable environment post being vacant for this period. When the post was taken up in April 2017, the CEO invited new members to the group and it reconvened in July 2017. Minutes of meetings attached Appendices 9.1.

2.6 Authority

The Sustainable Healthcare Environment Steering Group is authorised by the Senior Management Team to consider any activity within its terms of reference.

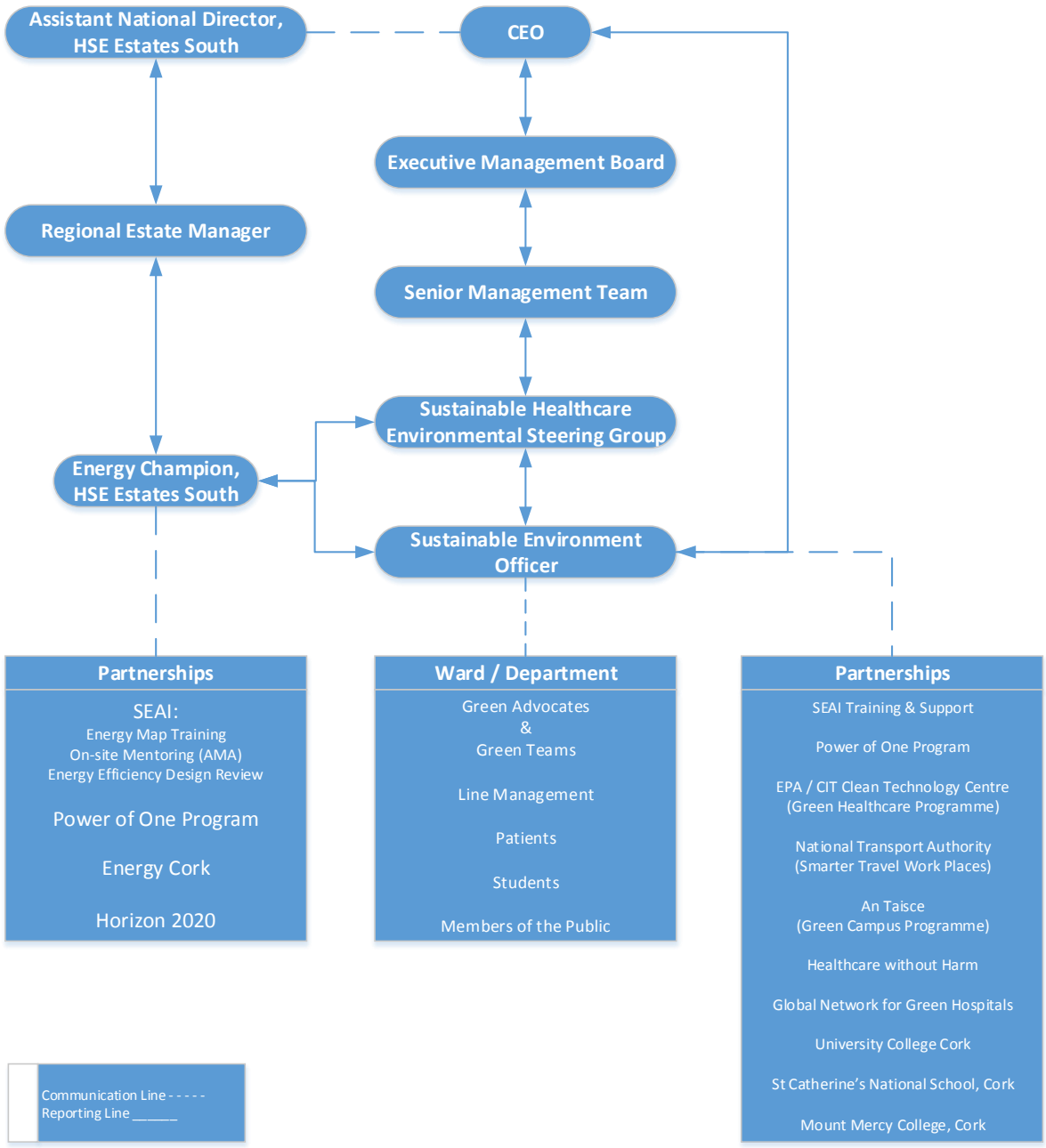
2.7 Communication Protocol

- The UCC/ CUH liaison person and the CUH Sustainable Environment Officer link CUH and the UCC Green Team.
- Relevant information is passed on to the Sustainability Environment Officer from various sources and is captured in the Register of Opportunities and or feedback to the Steering Group
- Ideas, suggestions and comments from staff and the Green Advocate Network can be made in person or presented on 'Suggestion for Improvement Form'. These are logged in relevant opportunity registers. Each idea will be assessed for feasibility.
- The Sustainable healthcare email account CUH.SustainableEnv@hse.ie is managed by Sustainability Environment Officer; it is widely advertised on notice boards, posters and newsletters and on the internet web page. It allows access to the programme by staff, students, patients, visitors and others.
- Land telephone line, mobile phone and internal communication to the Sustainability Environment Office is also utilized
- Feedback from staff, Green Advocate Network/ Drop-in Forum, patients, visitors and students will be reported back to the Steering Healthcare Group by the Sustainable Environment Officer.
- Minutes of the Sustainable Healthcare Steering Group are available on Q pulse for all staff to view.
- All technical projects and communication with Sustainable Energy Authority of Ireland is channelled through HSE South Estates, awareness campaign matters through Sustainability Environment Officer.

2.8 Reporting Responsibilities & Communication

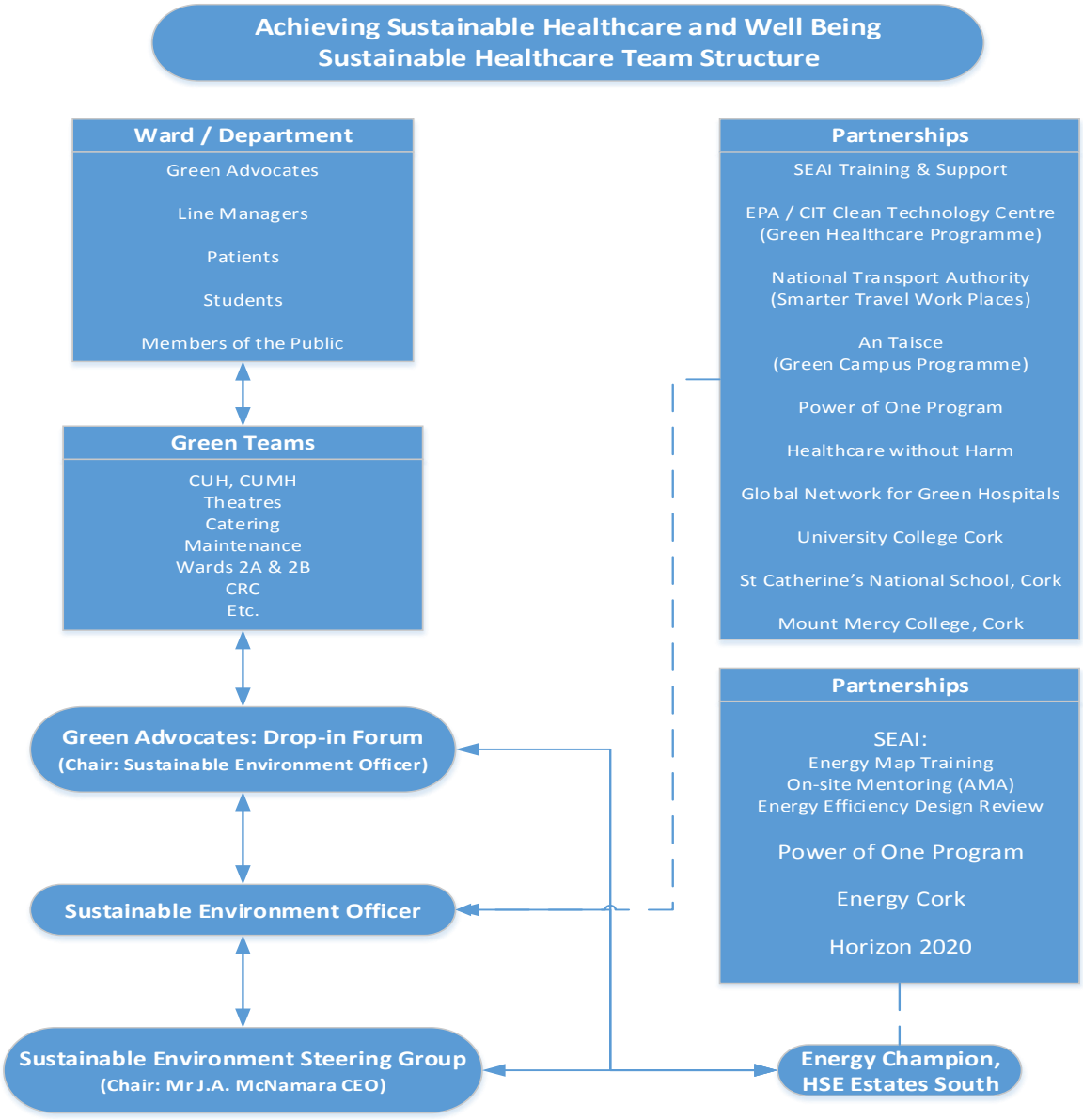
The campus Sustainability/Environment Strategy and Environment policy document was developed and formally approved by the senior management team and supports the work of the committee.

Figure 2-2: Cork University Hospital Campus Sustainability Healthcare Steering Group-Reporting & Communication Flow Chart



2.9 Green Teams & Green Advocates Network

Figure 2-3 Green Team, Green Advocate Network and linkages flow chart



2.10 Green Advocates

Our aim is to have a designated Green Advocate(s) within each ward / department who will play a key part in the Cork University Hospital Group achieving a sustainable campus.

Green Advocates is a voluntary role and staff either volunteer or are nominated by the Ward/ Department Manager/ peers. With a gap in the sustainable environment officer posts, it has been difficult to recruit new green advocates and gain attendance for drop

in forums held in the summer. OPW running an awareness campaign in November 2017 will nominate green advocates as energy champions for this awareness campaign.

Role of Green Advocate

The role of the Green Advocate is about:

- Actively promoting Cork University Hospital Group Sustainable Healthcare Environment initiatives to staff
- Maintaining own awareness about Sustainable Healthcare Environment issues around the hospital campus
- acting as a communication channel between staff/ students and the Green Team / Steering Group and Sustainable Environment Officer, so that we can develop initiatives and resolve concerns and
- Raising staff/ student awareness about the impact of their workplace upon the environment by reducing our carbon foot print, our energy consumption and associated costs, conserve water and manage our waste correctly
- Providing staff/ students with the tools to improve and minimize their environmental impact
- Facilitating and supporting staff in creating their own Sustainable Healthcare Environment opportunities for improvement and initiatives
- Help with events such as World Environment Day or Green Awareness days

Green Advocates forum

The purpose of the green advocate forum is to communicate and discuss environmental issues, ideas and suggest improvements. Staff and students are welcome to come along. The meeting is informal informational session run by the sustainable environment officer. The minutes of the meeting are recorded and distributed. All feedback is reported back to the sustainability steering group.

The currently over 100 green advocates on the green healthcare system, however in July 2017 there was a drop in forum and numbers were poor. It could have been down to summer holidays or people could not attend due to work commitments. The forums are an excellent way of gathering staff and students to discuss issues which could be similar in their departments, however in an acute setting time is very limited and it's more difficult for people to attend the forums. The OPW optimising power @work campaign commenced in November 2017. It is important for this period of time to focus on energy champions for this campaign. The teams for the energy campaign have green advocate representatives with a new title that will drive the green agenda from an energy perspective.

3 Environmental Review

3.1 Introduction

A sustainable healthcare system delivers high quality care and improved public health without exhausting natural resources or causing severe ecological damage. It balances environmental, social and physical aspects. There are three elements involved:

- Greening the Hospital campus
- Sustainable Healthcare System
- Sustainable Health and Well-being

Without understanding the culture in relation to the 'green agenda' it is difficult to make changes in an organization. In April 2013 the Sustainable Healthcare Environment Steering Group made a decision to launch an energy awareness and waste management campaign. Traditionally energy efficiency was seen as a 'back of house' activity and the emphasis was now placed on moving it to the 'front of house'. A mufti-theme approach was adopted for the campaign. Insights and information gained from staff surveys, audits, events and activities are used to inform the Steering Group; involve staff and the public; develop action plans and to monitor and evaluate. This is illustrated throughout the document.

The selection of new themes for 2017 Green Flag re-assessment was adopted through progress achieved over the last number of years in the areas of Water, Transport and Bio-Diversity. The environmental review will firstly focus on the maintenance themes energy and waste and secondly discuss the three new themes in detail.

Figure 3-1

New Themes	Maintenance Themes
Water	Energy
Bio-Diversity	
Transport	Waste
Evolution Of Buildings	

3.2 Maintenance Theme – Energy

Introduction

The public sector committed to an improvement in its energy efficiency by 33% by 2020. CUH campus took part in the power of one initiative in partnership with the SEAI in 2013.

Energy Status (Update)

CUH Campus spends an average 1% of its overall annual budget on energy. In 2017 this equated to €3,521,503. The OPW has recently started the Optimising Power @work initiative. The plan is for CUH to reduce the energy consumption by 8% by year end in 2018. This awareness campaign begins in October with sub metering being installed in early 2018.

Energy Management System

Energy is managed by Finance Department and Maintenance department. The finance department mainly focus on expenditure and trends for the following:

- Electricity
- natural gas
- fuel oil
- water charges

The Maintenance Department record the monthly energy consumption based on the information presented on the billing from the utility providers. For the Campus this consisted of:

- 1 utility bill for electricity received on a monthly basis
- 5 utility bills for natural gas received on a monthly basis
- Delivery dockets for fuel oil received in line with intermittent deliveries

Analysis of the utility bills consists mostly of checking for any abnormal charges, such as:

- Maximum Import Capacity (MIC) Excess
- Reactive Power

Any abnormal charges identified by the Maintenance Department were acted on internally, whether this was by checking the installed Power Factor Correction equipment is functioning correctly or reviewing the MIC for the campus in–line with on-going expansion.

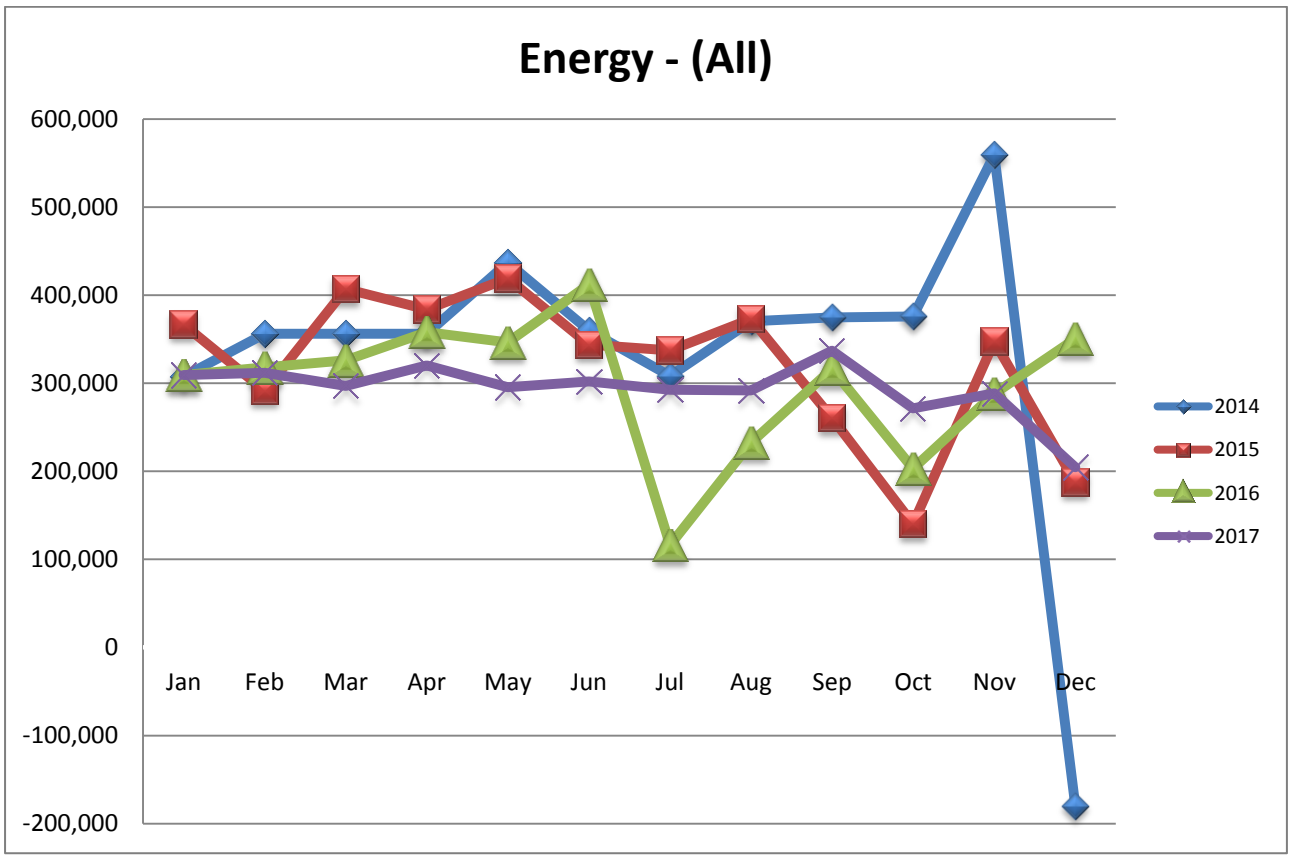
Furthermore, while the majority of larger power distribution boards within the various campus buildings would have energy metering installed; show that this metering was not manually checked at the distribution board.

Consequently, other than the energy consumption figures available from the utility providers billing information there was not further breakdown of the energy consumption across the various campus buildings.

Comparing Energy from 2014-2017 YTD

The following chart shows the total cost of energy consumption, for both gas and electricity for the campus.

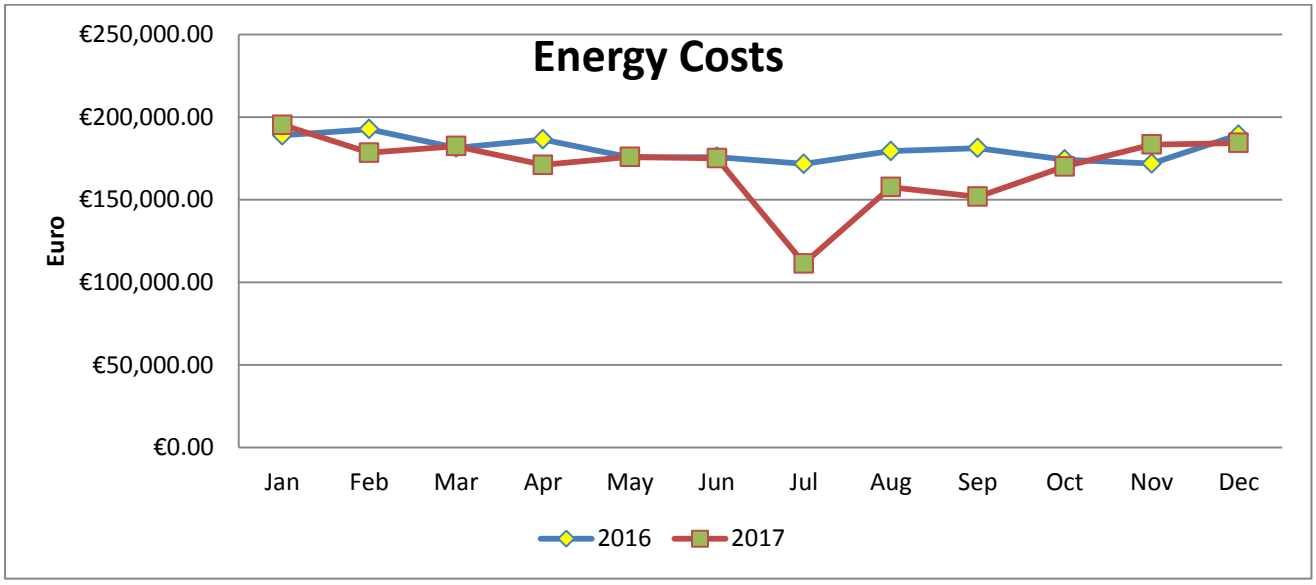
Figure 3-2



The chart above shows the total energy and gas costs from 2014-2017. Please note the downward trend in 2014 is due to delayed billing.

Energy Update

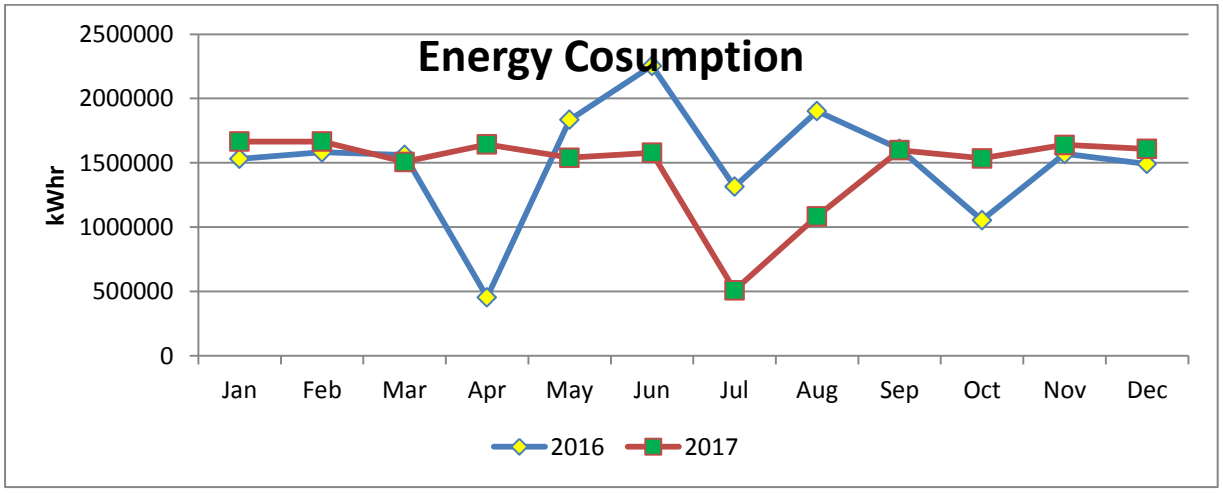
Figure 3-3



2016	€2,168,245
2017	€2,036,401

- The Commission of Energy Regulation (CER) increased capacity and distribution charges in October 2016 – had originally envisaged a bigger saving
- New national electricity supply contact effective since 1st June 2017. New supplier is Energia
- New rates apply since July 2017.
- Savings in 2017 €131,844

Figure 3-4 Electricity Consumption



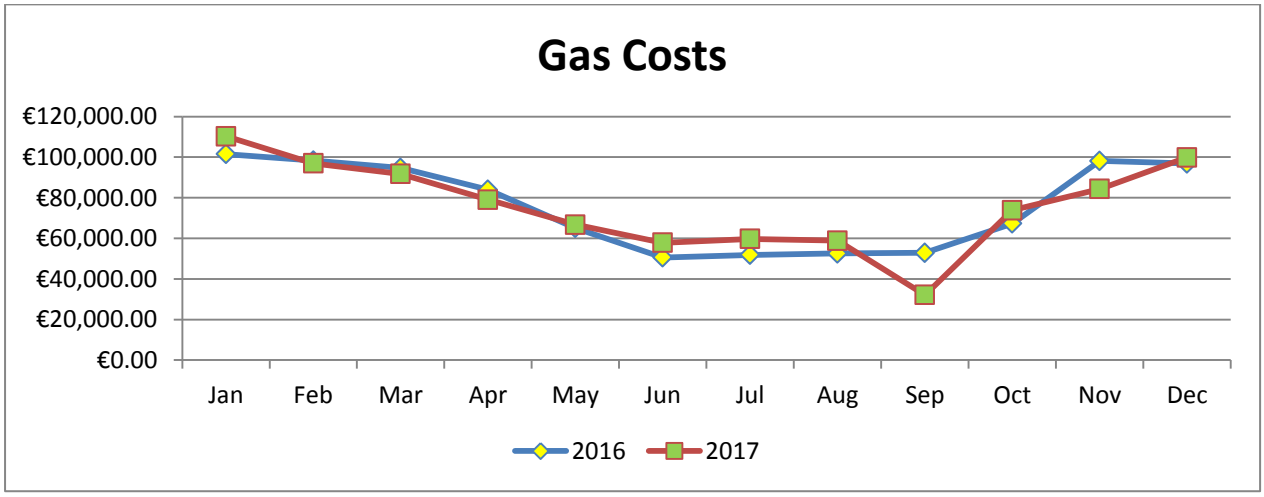
2016	1513455.00 KW/h
2017	1464738.58 KW/h

In terms of actual consumption of electricity in units of kWh, the table above compares 2016 versus 2017.This shows a slight decrease of 48717 kWhr in the overall use of electricity for the campus. While there have been some energy reduction projects, there also has been expansion on site.

- New paediatrics out patients opened.
- New xray machines.
- UCC top floor of paediatrics building.

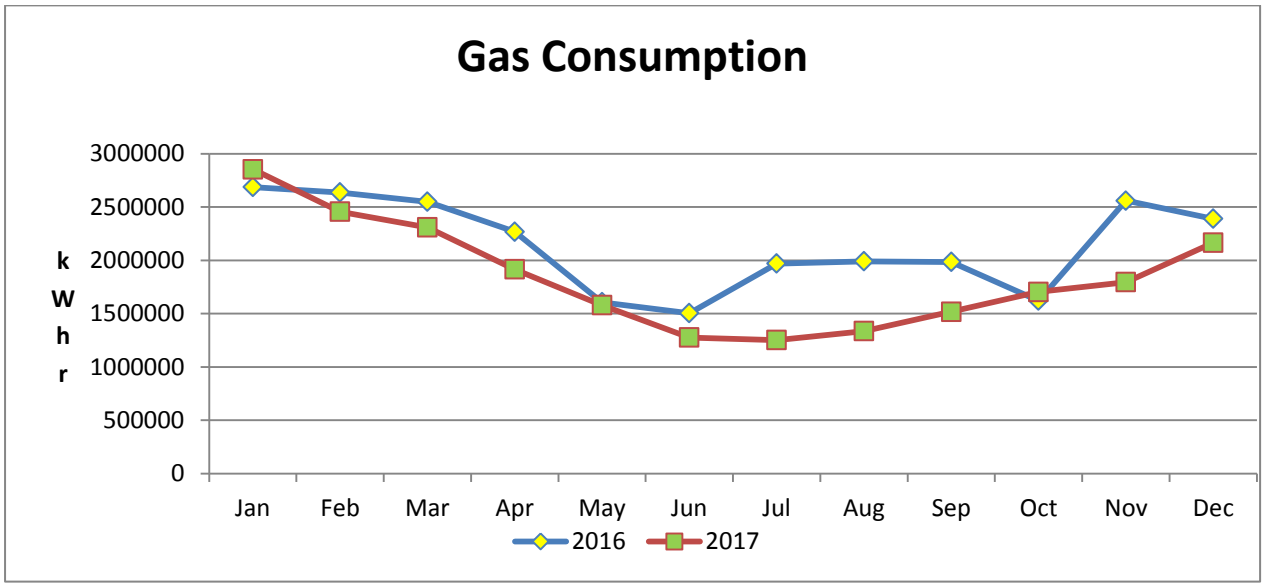
Comparing Gas from 2016 – 2017

Figure 3-5 Gas Costs



2016	**€913,740**
2017	**€911,350**

Figure 3-6 Gas Consumption

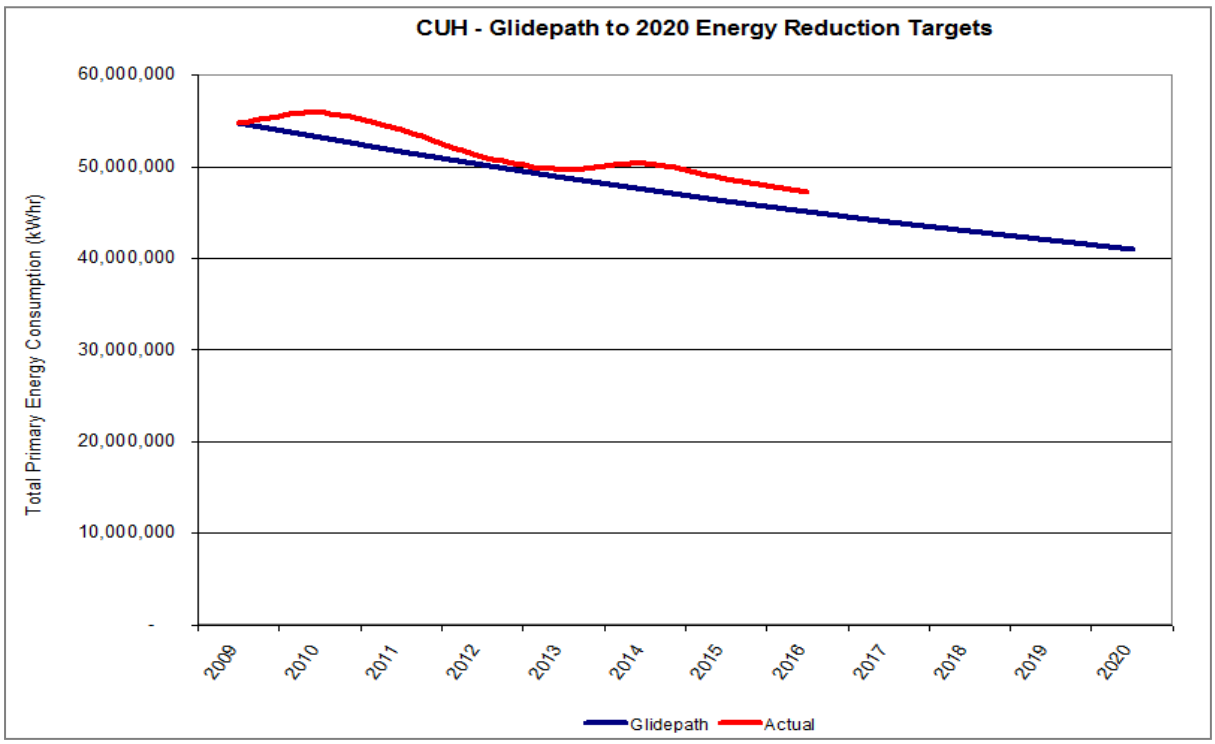


2016	25775492 KW/h
2017	22167556 KW/h

Gas consumption has reduced in 2017 by 3,607,936 kWhr. The gas costs have also reduced by €2,390 in 2017.

Combined Consumption-Primary Energy

Figure 3-7



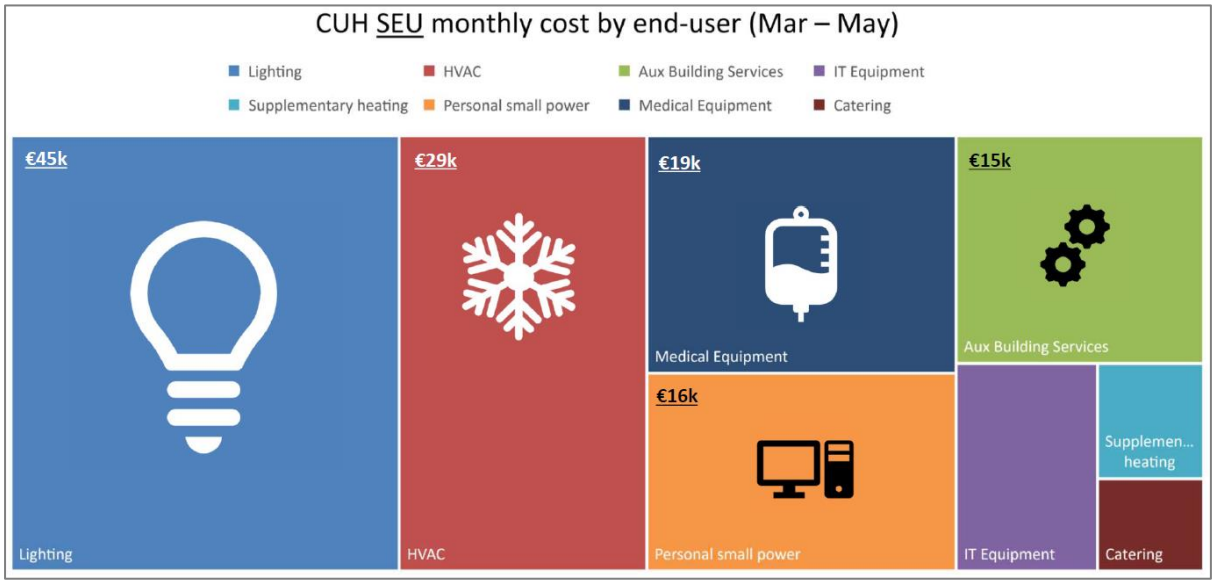
Glide path is presently being updated by an energy consultant.

- 17% primary energy reduction since 2009
- Currently 4% above glide path to achieving 2020 targets
- Approx. 2 GW energy

Completed Projects 2017

- Boiler house upgrade works – 2.5 GW
- New generator installed in accident and emergency department
- New car park lighting stage one complete. Stage in 2018
- Water booster sets installed with decrease in pumping costs and increase in energy efficiency.
- BMS upgrades
- 8 energy meters fitted software system being installed in early 2018

Figure 3-8



3.3 Lighting project 2017

The following lighting projects were carried out

Figure 3-9 Canteen lighting

Fittings	Watts	Total Watts	Lamp Life
33 original fittings	52	1700	10,000hours
33 new LED fittings	28	920	30,000 hours

Overall there is a 46% reduction in energy and 3 fold life cycle increase for lamps in the canteen.

Figure 3-10 Church stations lighting

Fittings	Watts	Total Watts	Lamp Life
23 original fittings	72	1700	10,000hours
11 new LED fittings	24	920	30,000 hours

Overall there is a 75% reduction in energy and 3 fold life cycle increase for lamps in the church.

Figure 3-11 5 south Office Maternity

Fittings	Watts	Total Watts	Lamp Life
4 Original Fittings	110	440	10,000
2 new LED fittings	40	80	35,000
Difference	360	360	25,000

Overall there is a 55% reduction in energy with 2.5 fold lifecycle increase.

Figure 3-12 X-ray Nuclear Medicine waiting area

Fittings	Watts	Total watts	Lamp Life
9 Original Fittings	26	234	10,000
2 new LED fittings	40	80	35,000
Difference	154	154	25,000

Overall there is a 46% reduction in energy and a 3 fold life cycle increase.

Figure 3-13 Delivered energy performance benchmark (GJ/100m3)

Size/ type healthcare	Good Practice (new refurbished)	Good Practice (Existing Buildings)	CUH
Teaching and specialist Hospitals	<55	<65	<64
General Acute hospital	<52	<62	<64

The table above refers to the HSE benchmarks for energy performance within its buildings. The National Energy Efficiency Action Plan (NEEAP) 2009-2020 **has set a public sector 33% energy saving target by 2020.** This target needs to be implemented across all buildings.

3.4 Building Sustainability Evolution:

The Irish National Building Regulations have been revised since the original Cork University Hospital (CUH) Campus was constructed in 1979. Over the intervening years, the emphasis in building design has moved towards sustainable building design, construction and performance.

CUH have an existing environmental policy that sets out an overall sustainability vision, as well as detailed objectives and targets. These all form part of the Green Flag programme in CUH and Heath Service Executive (HSE) Estates support these requirements by applying the relevant statutory and good practice recommendations to all building activities from conception to completion in a healthcare setting.

Sustainability in building developments is a vast and complex subject that must be considered from the very earliest stages as the potential environmental impacts are very significant. Once a project is initiated to build a new building, or refurbish an existing building, a very significant commitment to consume resources has already been made. While HSE Estates help limit that consumption, HSE Estates cannot change the overall commitment, and therefore ensure that Design Teams appointed for these projects adhere to the performance of the building and selection of materials set out by HSE Estates. It is HSE Estates' Policy to undertake the Key Action Points of the Department of Public Expenditure and Reform (DPER) document - *Green Tenders; An Action Plan on Green Public Procurement*.

HSE Estates supports the CUH Green Flag accreditation by implementing the action *plan* and have developed *Sustainable Healthcare Building Guidelines* which impact on all aspects of a proposed project, particularly:

- the appraisal of projects
- option appraisals
- development of project briefs
- development of design briefs and specifications
- evaluation and assessment of tenders
- material selection
- construction methods

- In addition, the *Sustainable Healthcare Building Guidelines* recommend that buildings constructed by HSE Estates consider the following key objectives:
- Construction design and specifications are based on core environmental criteria required by relevant EU and national legislation.
- Priority is given to reuse of existing buildings over new-build construction (if appropriate in the healthcare setting).
- Design: Effective energy efficient design strategies are incorporated in all projects at the early design stage, so that energy efficiency and other environmental measures are incorporated into the project from inception.
- The Energy Performance of Buildings Regulations (S.I. No 666 of 2006) requires that for new buildings with a gross internal floor area of greater than 1000 sq m, consideration is given to installing alternative energy sources (renewable, biomass, etc) at design stage.
- Specify energy efficiency design is undertaken to reduce primary energy demand, maximise delivered energy efficiency and secure energy supply in the least carbon intensive form practicable. This approach supports Building Energy Rating (B.E.R.) which is required for any new public building with a gross internal floor area greater than 250m^2,(S.I. No 243 of 2012).
- Aspects of environmental impact which are particularly relevant to the construction projects include land use, habitat protection, air quality and groundwater, including flood attenuation. All these aspects are considered by the HSE led Design Team in detail design
- All materials used in construction projects are assessed for environmental impacts HSE Estates refer to Building Regulations 2011, Part L, and specify construction materials with low U values. Include embodied energy (eCO2) resource use, responsible sourcing, construction wastage, durability, recyclability and disposal.
- HSE Estates implement the Energy Efficient Public Procurement Regulations (S.I. No 151 of 2011) which outlines the requirement to only procure equipment registered on the SEAI's Triple E Product Register. (If appropriate in the healthcare setting).
- Construction Tender documentation specifies wood or timber used in construction projects, as certified legal and from sustainable sources i.e. Forest Stewardship Council (FSC) or Programme for Endorsement of Forest Certification Schemes (PEFC) or equivalent.

3.5 Energy Conclusion

CUH campus has seen an decrease in energy consumption due to new builds onsite. The optimising power at work initiative is projecting an achievable reduction of 8% in the next 12 months. There are more than 17 energy champions at present assisting in the OPW project. In late 2018 the campus will be fitted with new sub meters to monitor energy and this will pin point the areas that need help managing the energy.

3.6 Maintenance Theme- Waste

Introduction

Waste as a green flag theme was awarded in 2014, the various waste streams are monitored and analysed monthly with regular training being provided to staff. Auditing of the waste streams is carried out on a regular basis. Waste audit tool appendices 10.2. The waste stream in CUH has changed over the last three years with recycling being rejected, there has been an increase in municipal waste in 2015 and all recycling is now going for energy recovery hence increasing costs.

Waste Streams

- Four broad streams of waste are produced on campus. There are listed hereunder and include
- **General waste (reported in 2014/2015)**
- Items that cannot be recycled and are disposed as landfill
- **Energy Recovery(Currently available as recycling being rejected)**
- Mixed dry packaging including medical packaging.
- **Recycle Waste**
- Dry Mixed Recycling (**Currently not available)**
- Mixed Packaging Cardboard
- Mixed Glass Recycling
- Mixed Ceramics Recycling
- Confidential Waste shredding
- Metal recycling
- Biodegradable and Organic Waste include formula milk
- Residual bulk items not suitable for compaction.
- Vegetable Oil Recycling
- **Hazardous Waste**
- Chemicals
- Batteries – recycling
- Fluorescent lights – recycling
- WEEE –recycling

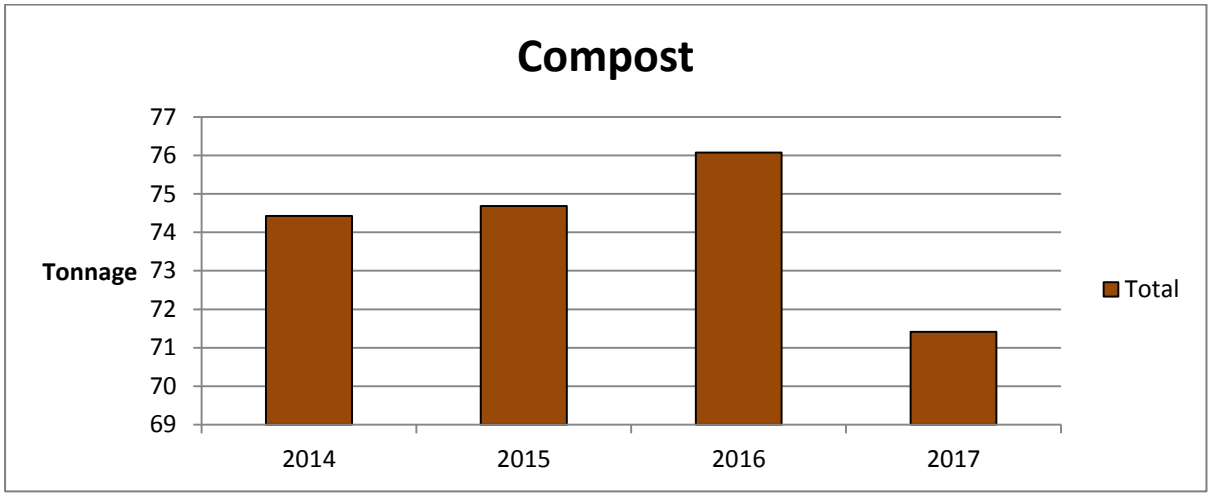
- **Healthcare Risk Waste (HCRW)**
- **HCRW**
- Soft yellow bags of blood stained wastes including dressings from patients with know / suspected pathogens. Sent for disinfection by sterilization.
- Yellow lidded rigid sharps bins/ boxes for needles, lancets, suture removers & other sharps. Sent for disinfection by sterilization.
- Yellow lidded rigid bins for small volumes of free fluid, blood and body substances, pathology laboratory waste. Sent for disinfection by sterilization
- Black lidded rigid bins for a
- Anatomical body parts band metal waste. Sent for incineration
- **Special HCRW Waste** - Cytotoxic waste; pathology, drugs
- Purple lidded rigid bins and purple lidded rigid sharp boxes for cytotoxic materials and pharmaceuticals.

Types of Waste

Food Waste

The food waste survey carried out in 2010 brought about huge changes to the Catering Department giving patient's choice of small meals and reducing the size of the average portion. The introduction of snack service in September 2015 gave patients an option of healthy snacks in between meals. This service was implemented to improve nutrition and also ensure between tea service and breakfast they had adequate nutrition. The food waste has seen an increase in 2016 with inpatient numbers exceeding 800 on a daily basis. In 2017 the food waste decreased by 4 tonnes and this was due to portion control and menus in each ward. In 2018 there will be a more nutritious menu offering choice but lighter options at tea time.

Figure 3-14 Food Waste 2014-2017



Non Risk Waste (General Waste)

The general waste stream has seen a huge increase since 2014 due to increased activity within the hospital. The increase is also due to the rejection of recycling in 2015 and thus recycling being sent for energy recovery. The chart below shows the effect that the rejection has on general municipal and Dry mixed recycling waste streams from 2014-2015 However in 2016 the waste contractor began processing the waste in their facility in Cork for recovery. CUH had zero landfill in 2016 and 2017.

Figure 3-15 Municipal Waste 2014-2017

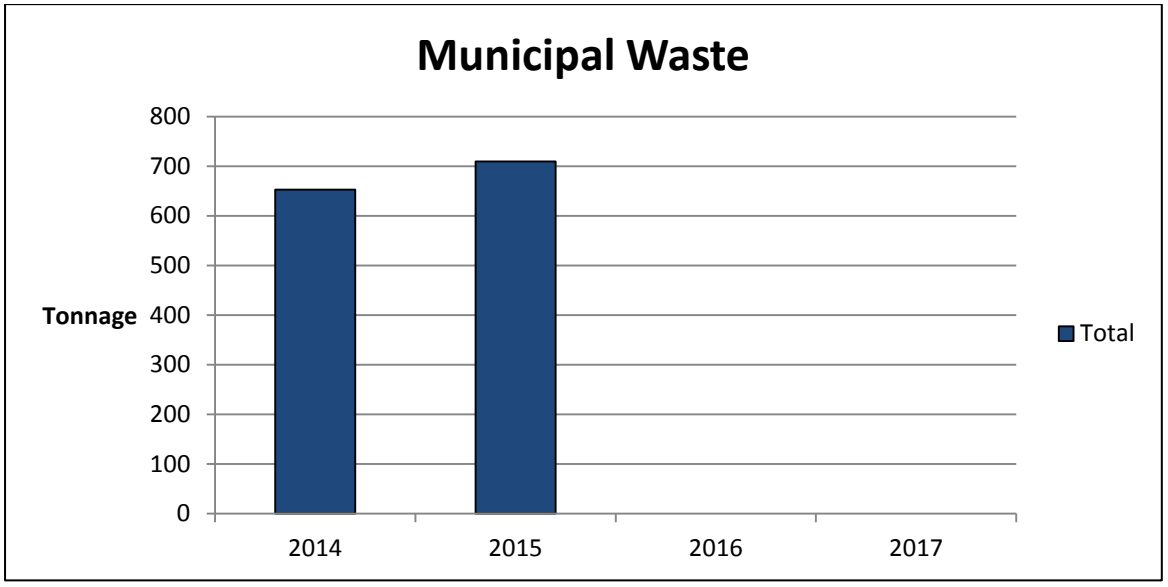
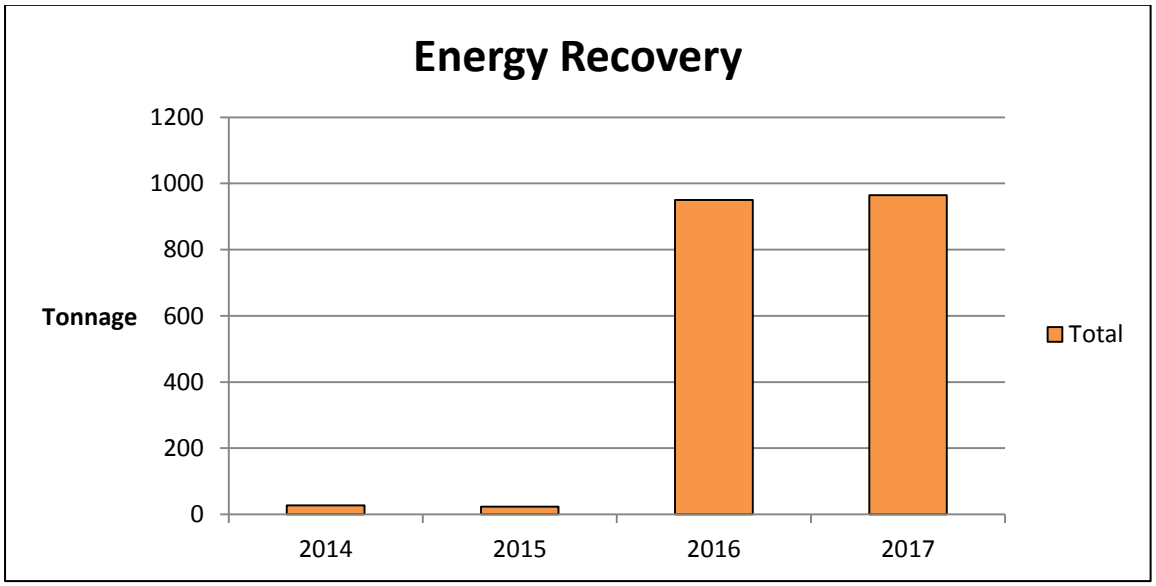


Figure 3-16 Energy Recovery 2014-2017



Energy Recovery

Recycling is being rejected on campus at present. The only option for the campus was increase energy recovery until the non – risk waste contract was renewed through the Office of Government Procurement. The top producers of waste were targeted in 2017. The A+E, ICU, Theatres, Dialysis, CRC Theatre and CUMH. All areas changed to energy recovery due to the high level of contamination in the recycling stream.

Figure 3-17 Recycled cardboard 2014-2017 year to date

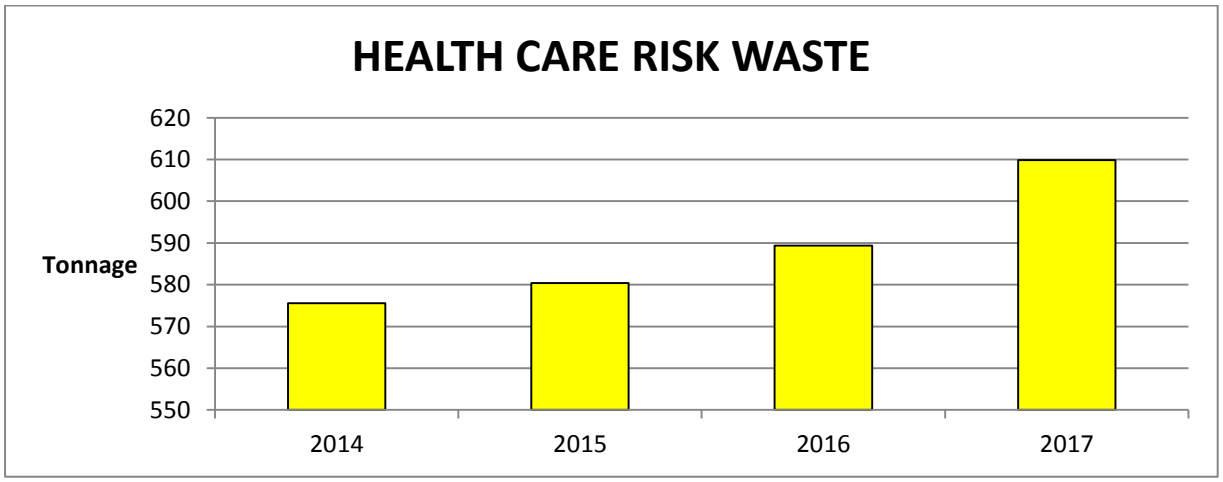
Year	Tonnage
2014	108
2015	104.62
2016	108.02
2017	109.58

The recycled cardboard is baled on site and then collected by the non-risk waste contractor weekly.

Healthcare Risk Waste

Healthcare risk waste is the more complex waste stream in the hospital and has the highest disposal costs due to the risks to patients and staff. Since 2014 there has been a huge drive on reducing the monthly tonnage. However due to increase activity and staff behaviour it has increased. The HCRW contractor provided training to the top ten producers in the summer of 2017, with a view to reducing the amount of general waste that often ends up in the yellow bag.

Figure 3-18 Healthcare Risk Waste Tonnage 2014-2017



Special Waste

The special waste stream remains the most expensive stream per tonne. It has increased in the last 12 months due to a change in practice. In 2016 all anatomical waste from Histopathology had to be disposed of into the special waste stream. This waste has to be sent abroad for incineration.

Figure 3-19 Special Waste Tonnage 2014-2017

OTHER WASTE STREAMS

Litter

There are 25 external waste litter bins throughout the campus that are emptied by the ground men. The busy areas for litter are front of CUH, CUMH and emergency department entrances.

Up cycling of furniture

CUH introduced an initiative in 2015 to, re-use as opposed to dispose any furniture/equipment surplus to requirements. A picture of the furnishing or piece of equipment is sent around by email to all users where they can call and avail of this piece of furniture or equipment. Commercial equipment would go for tender if surplus to requirement. All furniture which is not fit for purpose after audit but is in good condition can be sent to a Haiti orphanage.

Re-use of materials from the previous Mental Health Unit in Ward GF

The re-use of building materials is something that is considered in every new build to keep costs low, but also to recycle materials that are in good condition and fit for purpose. The new Acute Adult Mental Health Unit (AAMHU) unit was opened in 2015. Materials such as bathroom suites lighting were used in the new building. The office desks were used in the new building. Unfortunately they envisaged using more material

but the outer cladding of the building had material of a hazardous nature which could not be re-used.

X-Ray Recycling Project

XRS, an external company, looked at the cost and storage of old x-rays. The Sustainability Officer and the Radiology Department began looking at x-rays which could be recycled in 2016. The silver and plastic from these x-rays could be recycled. Iron Mountain was awarded this contract in early 2017 and it will take one member of staff until the end of 2018 to manually extract all strips from the old x-rays. The monetary benefits of this will not be known until early 2019.

Non risk waste tender

CUH campus has been engaged with the Office of Government Procurement (OGP) and is entered into a mini competition for a new non-risk waste tender. The tender submission from Greenstar was successful and a contract was signed in April 2018. The importance of the resulting contract ensures that Greenstar will accept recycling and all packaging specified in the tender detail. CUH has now become landfill free, with all waste that cannot be recycled being sent for energy recovery.

CUMH Milk Waste

To evaluate the environmental impacts of infant feeding, researchers from the University of Limerick and the Environmental Protection Agency developed methods for data gathering to determine levels of milk waste. Preliminary data collection from University of Limerick Maternity Hospital and Cork University Maternity Hospital has begun. The research team, Dr Yvonne Ryan-Fogarty, Postdoctoral Researcher and Dr Bernadette O'Regan, as Principal Investigator are keen to pour their collective experience into the research.

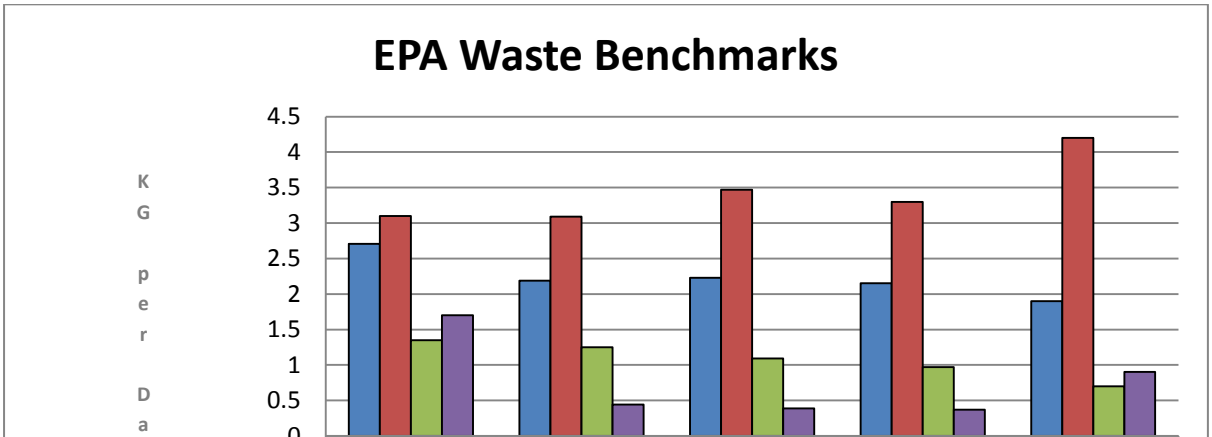
The research team used very specific future visions (backcasting) where both key health "*WHO Global Strategy on Infant and Young Child Feeding* and *HSE Infant Feeding Policy for Maternity and Neonatal Units"* and environmental "*EU Waste Framework Directive"* policies are aligned. This allowed the researchers to conduct problem orientations for specific waste types. One of the first to be examined using back casting was waste ready to use breast milk substitutes. "This analysis provided really interesting results. The problem orientation phase showed that **61% of ready to use breast milk substitutes purchased are** prevention and management of this waste. Solutions included waste **prevention techniques, product redesign and innovation, procurement and waste management practices.**

Management of Waste

Waste is managed on site by the waste officer and the sustainable environment officer who also has a role in waste. Waste is a permanent item on the CUH hygiene services team agenda. The waste policy covers all aspects of waste from generation to disposal. The policy gives clear instructions to the reader on how the streams are managed and how they need to be handled before disposal. Waste data is managed through online systems provided by the waste contractors. Bin location guidance is enforced on all wards with weekly ward audits being carried out. The private catering facilities on site are responsible for their own waste streams. Waste management involves ensuring that we prevent, minimise, reuse/recycle and provide on-going training to all staff.

EPA Waste Benchmarks

Figure 3-20 CUH Waste Benchmark 2014-2017 Versus EPA Benchmark



	2014	2015	2016	2017	EPA
Health care risk waste	2.708	2.19	2.23	2.15	1.9
General Waste	3.1	3.09	3.47	3.3	4.2
Food waste	1.35	1.25	1.09	0.97	0.7
Recyclables	1.7	0.44	0.39	0.37	0.9

The Green Healthcare Programme benchmarks are CUH versus other Acute Hospitals in Ireland. 50% of acute hospital bed capacity in Ireland was surveyed in the process. CUH has seen an increase in HCRW over the last number of years due to increase in inpatient bed days. The increase is seen in all waste streams in the graph above. CUH food waste is dehydrated and for the purpose of this benchmark the tonnage was multiplied by 4 to include liquid waste weight.

Conclusion of Waste Review

The campus waste stream is complex with varying amounts generated in so many different departments. A huge amount depends on the staff behaviours in these departments. All hospital personnel including visitors are responsible for the generation

of waste and disposal. There is scope for improvements in all levels of waste. The new contract for non-risk waste will re-introduce recycling campus wide. There is room and effort needed to minimize the amount of non-risk waste being disposed of in a risk waste stream.

3.7 Main Theme-Transport

Introduction

CUH is a smarter travel workplace. In 2013 the CUH CEO entered into a formal partnership with the National Transport Authority Smarter Travel Workplaces. The campus has almost 4000 staff with only 1010 staff spaces on-site and 300 spaces off – site. The campus staff use a variety of ways to travel to and from work. The transport system to the hospital is straight forward with various buses passing the hospital and the city centre train station. However the traffic volumes surrounding the hospital have increased.

Mobility Management Committee

The mobility management committee was set up in summer of 2015. This Committee is concerned with the enhancement of Cork University Hospital as a sustainable smarter travel workplace. The *Mobility Management Plan 2015* forms the basis for the work undertaken by the Committee. The overall aim of the Committee is to reduce car usage for all people travelling to the site.

Short Term Objectives

- Further develop and publicise the existing travel page of the CUH website;
- Enhance facilities for pedestrians, cyclists and vulnerable users within the campus;
- Establish a Bicycle User Group;
- Enhance access for disabled users;
- Promote public transport incentives including the tax saver scheme;
- Oversee mobility management coordination and monitoring including staff, visitor and student surveys;
- Assess modal split and revise targets, as appropriate, based on surveys and measures implemented.

Medium and Long Term Objectives

- Reduce car parking spaces to staff/visitor ratio;
- Promote carpooling and establish carpooling priority parking spaces;

- Coordinate the on-going enhancement of facilities for pedestrians, cyclists and venerable users, including new building and external to CUH;
- Provision of electric vehicle charging stations;
- Establishment of park/ride and walk systems;
- Oversee mobility management coordination and monitoring including conducting travel surveys every 12 months;
- Assess modal split and revise targets as appropriate.

CUH Campus 2014 -2017

CUH have experienced a further increase in staff and visitors since the last mobility management assessment in 2015. There has been no increase in staff parking onsite to meet the demand. The reduction in car dependency of staff on campus is detailed hereunder,

Staff Car parking

CUH provides 1,010 staff car parking spaces on site and the campus has fewer than 4,000 staff. In addition to this there are two park and walk facilities available also off-site. The staff car parks are controlled access with staff working at 8am and 9am queuing at 6.30-7.30am. The car park is on a first come first serve basis. There are 137 spaces onsite which are paid staff parking with a fee of €1,000 annually.

Figure 3-21

Onsite staff parking	Off Site staff Parking	Public Parking	Staff Paid Parking
873	300	546	137

Mobility Management Plans Modal split tables

Staff questionnaires were distributed in CUH and online to assess the existing travel patterns and compare the data.

Figure 3-22 Modal Split Targets in 2014

Mode	Modal Split (2010)	Modal Split (2014)	Future Split (2019)
Car - driver	75.8%	72.2%	54.0%
Car – passenger, driver going to the same destination	2.1%	2.7%	4.0%
Car – passenger, driver going to a different destination	1.4%	2.9%	3.5%

Bus	2.6%	3.2%	5.0%
Train	0.1%	0.6%	1.1%
Motorbike/ Scooter	0.3%	0.9%	1.5%
Cycle	1.8%	5.2%	10.0%
Walk	13.2%	11.5%	18.5%
Taxi	0.1%	0.9%	0.9%
Combination	2.5%	0.0%	1.5%

Figure 3-23 Modal split Targets 2015

Mode	Modal Split (2010)	Modal Split (2014)	Modal Split (2015)	Future Split (2020)
Car - driver	75.8%	72.2%	78.3%	54.0%
Car – passenger, driver going to the same destination	2.1%	2.7%	1.7%	4.0%
Car – passenger, driver going to a different destination	1.4%	2.9%	2.4%	3.5%
Bus	2.6%	3.2%	3.9%	5.0%
Train	0.1%	0.6%	0.6%	1.1%
Motorbike/ Scooter	0.3%	0.9%	0.3%	1.5%
Cycle	1.8%	5.2%	4.6%	10.0%
Walk	13.2%	11.5%	7.4%	18.5%
Taxi	0.1%	0.9%	0.5%	0.9%
Combination	2.5%	0.0%	0.3%	1.5%

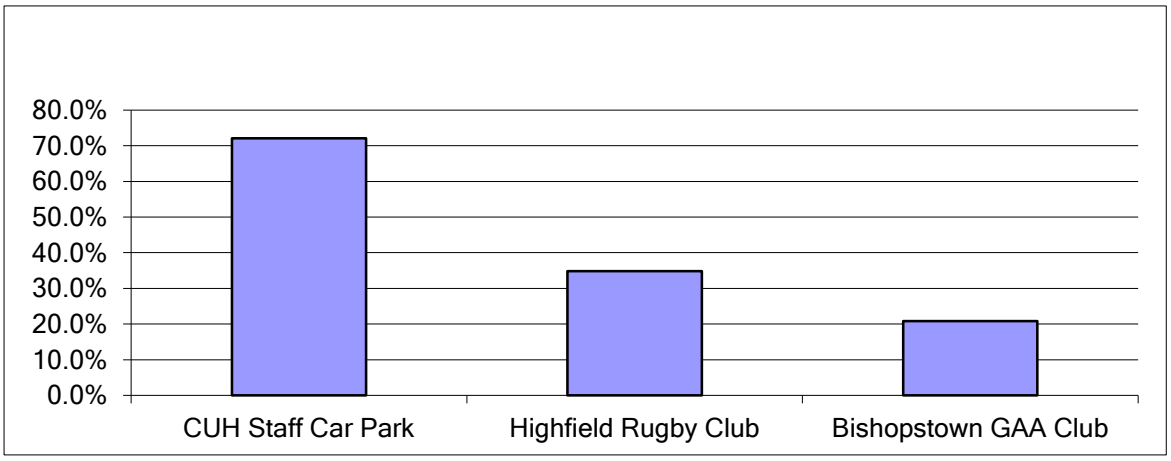
Staff Parking Survey January/February 2016

Figure 3-24 ***A total of 673 people responded to this survey. The survey closed on 19/02/16.***

Where do you currently park your car? You can select more than one option here.		
Answer Options	**Response Percent**	**Response Count**
CUH Staff Car Park	72.1%	447

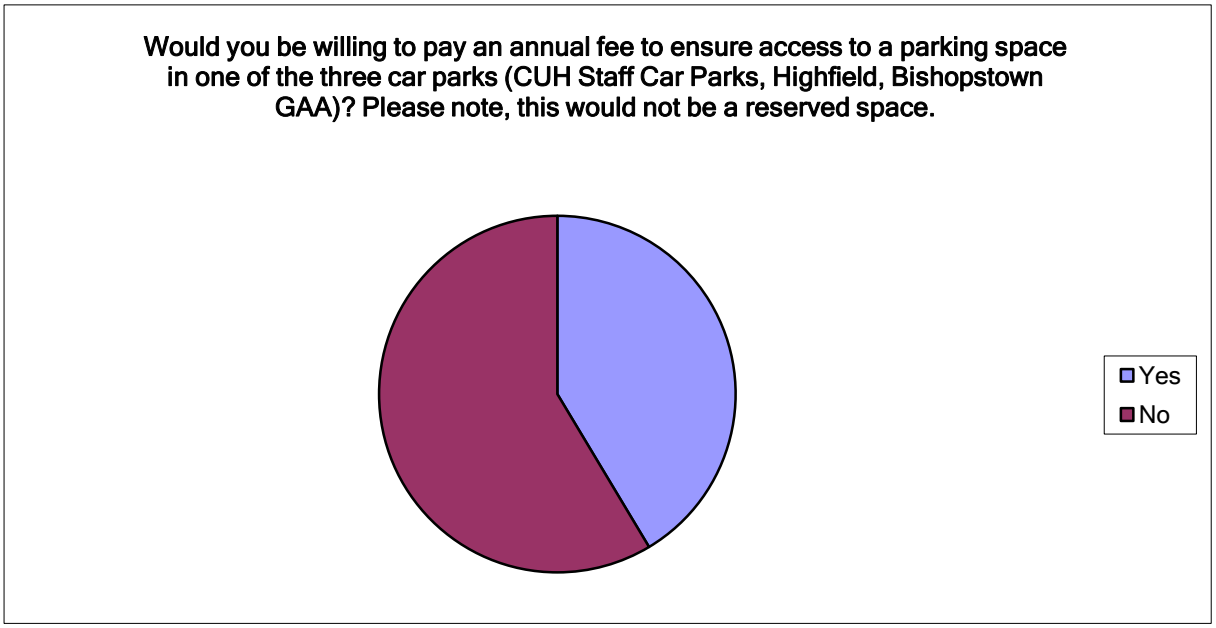
Highfield Rugby Club	34.8%	216
Bishopstown GAA Club	20.8%	129
Other (please specify)		125
answered question		**620**
skipped question		**53**

Figure 3-25



Staff also indicated that they park at the back gate or use street parking (with parking discs), use Wilton Shopping Centre or have other private arrangements. At least 21 staff indicated that they frequently use the paid public car parks.

Figure 3-26



Comments:

- Those willing to pay an agreed sum would only do so if guaranteed a parking space. Some respondents went so far as to state that this would have to be a reserved space. There were suggestions that spaces on-site should be more expensive than spaces in Highfield and Bishopstown.
- Staff who are working part time responded that they would not be willing to pay a flat fee for parking.
- There were suggestions that charges should be on a per day basis (as opposed to a flat annual rate). This is a fairer method of charging for those who need their vehicle for work and it would also discourage unnecessary car use.
- Some respondents expressed a concern that once introduced, an annual fee would increase year on year.

• **Do you have any suggestions on improving staff parking?**	
• **Answer Options**	• **Response Count**
• ***answered question***	• **434**
• ***skipped question***	• **239**

Common Suggestions:

- Staff who work 9.00-17.00 or "office hours" should be encouraged to park off-site at Highfield/Bishopstown GAA. On-site parking should be prioritised for shift workers who start early /finish late (after 20.00). It is too late to walk to Highfield/Bishopstown after 20.00 as it is too dark in the winter months and some staff can feel unsafe.
- Open access to Highfield from Consultants Private Clinic – this would make people much more likely to use Highfield as an alternative to parking on-site. Lit paths to Highfield and Bishopstown GAA would also increase the likelihood of people using them.
- Open the Dental Hospital/Consultants Private Clinic/Main Public Car Parks for use by night staff during certain agreed times. This would alleviate immediate pressure on parking early in the morning.
- Constructing a multi-storey car park was frequently referenced.

- Charge for more on-site reserved spaces and keep the off-site parking free of charge.
- Car Pooling Incentives – guaranteed a space and guaranteed to be able to leave on time.
- Encourage people to walk/cycle and use public transport where possible.
- Any parking fee that applies to staff working in CUH should apply to Farm Centre, Model Farm Road, Mallow, Bantry etc.
- Clerical and 9-5 staff should be allocated a separate area to the 24/7 staff.
- Pay as you go parking for on-site spaces – one charge per day via swipe card, if an annual fee then a space should be guaranteed. Off-site parking should be free.
- Tiered payments for the various car parks might allow for greater revenue and also offer people with a choice.
- Introduce park and ride/shuttle bus systems.
- Tarmac and line the overflow car park in order to maximise the use of space and make it more efficient.

Campus Bike Week September 2017

CUH collaborated with UCC and CIT this year on campus bike week. The planning for this event started in early summer 2017. This was the first year that UCC invited CUH and CIT to get involved. CUH created banners based on real cyclists on-site and the reason they cycle to work. There were also banners on costs of cycling and health benefits. CUH had a bike week coffee morning, inviting all cyclists and people interested in cycling to attend and discuss cycling issues both positive and negative. This brought forward much discussion on facilities, bike sheds and cycling safety tips for staff. Cork Community Bikes also did a demo in the canteen on maintenance of your bike. We also had a lunch time cycle where all cyclists were invited to take part, along with UCC and CIT. Minister Simon Coveney, when launching the CUH sustainability change programme booklet, had huge interest in the campaign. Currently there are 5.6% of employees cycling to work; the campaign aim is to share more information on the benefits of cycling to work.

Figure 3-27 Pictured below; Minister Simon Coveney, Maria Kirrane UCC and Aoife O Connell CUH

Pedometer challenge 2014-2017

The Pedometer Challenge is organised by the National Transport Authority in partnership with the Irish Heart Foundation and has gained huge interest in CUH over the last number of years. **October 2015** Teams from Cork City Council, Cork University Hospital and Cork County Council took the top three spots in the 2015 Pedometer Challenge. More than one and a half billion steps were taken by 986 teams from 53 of Ireland's largest workplaces as part of the Smarter Travel Workplaces Annual Pedometer Challenge. In 2016 16 teams participated in CUH with the overall winners 'Young and Old'. In 2017 14 teams participated and the overall winners for the second year running were again the 'Young and Old' clocking up 608881 steps.

Figure 3-28 Pictured below; The winners of 2017 Pedometer challenge 2017 Bernard Murphy, John Bohane, Kieran Walsh, Rodney Higgins and Carmel McCarthy

Transport Mobility Forum

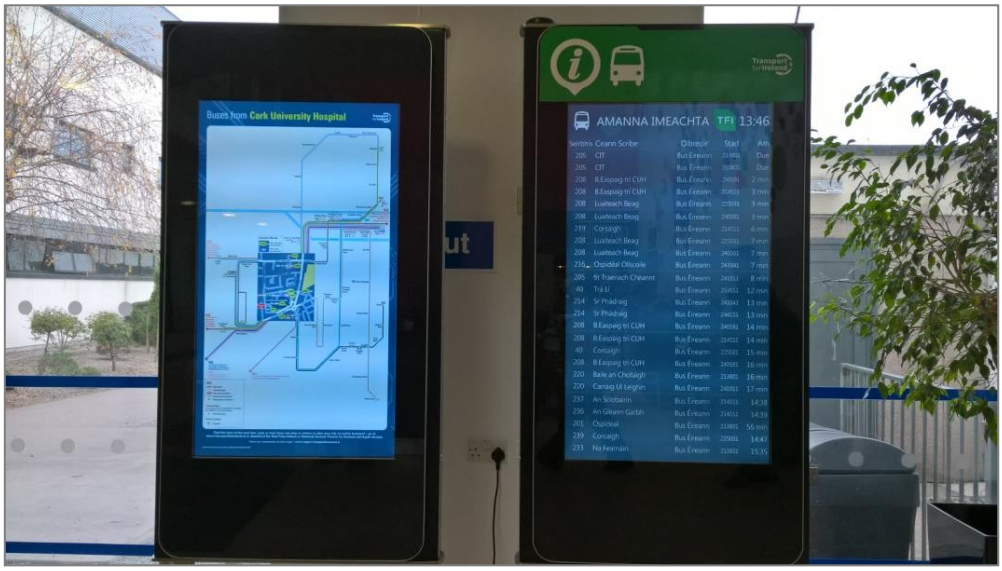
In a society dominated by single occupant vehicles, now more than ever, there is a greater emphasis on the importance of mixing our modes of transport to become more competitive as an economy. By choosing to use sustainable transport such as; walking, cycling, carpooling and catching a train or bus to school, college, work or for leisure, people can make significant savings and lead healthier lifestyles while reducing their carbon footprint.

The CUH Sustainable Environment officer joined the Transport Mobility Forum in 2016. The hospital is ever expanding and with annual mobility management plans it was important to engage with the city and county councils, along with the public transport authorities that also sit on the group. The purpose of the group is to discuss issues with public transport cycling walking and general mobility management issues within the city and county. Promotion of smarter travel through NTA and local groups is part of TMF.

CUH Travel and Transport Web pages

CUH has information for patients on travelling to and from the hospital. CUH website provides information on travel by car and by bus with all relevant bus timetables. The website also provides the local area information, pharmacy, bank and restaurants. The hospital map is attached which shows the patient or visitor the way around the campus. This information is also useful for new staff to access a map and bus information. The TFT screens are available for both staff and visitors with bus timetables and maps showing the times of the buses in real time. The TFT screens were erected in early 2016 and are sponsored by the NTA. The screens provide real time information to all hospital users commuting to and from the hospital.

Figure 3-29



Travel and transport links

Linkages are firmly established with the following organizations and agencies,

- An Garda Siochana-local garda visit regularly as part of the hospital watch scheme.
- Iarnrod Eireann and Bus Eireann
- National Transport Authority
- Transport Mobility Forum
- CIT
- UCC Travel and Transport

Transport Conclusion

CUH campus is close to the city with public transport available at the doorstep. However with modal splits suggest that the public transport system is not fully utilised and people are more likely to drive as a single occupancy vehicle to CUH site on a daily basis. The aim is to reduce the car-driver percentage from 78.3% to 54%. The Mobility management survey to be reviewed in 2018. The National Transport Authority are looking at the CUH mobility management plan to reduce the traffic congestion and ways of supporting a public transport system that will suit all staff needs.

3.8 Main Theme-Water

Introduction

Providing high quality water for patient care is essential in a hospital setting. Water is used all day every day and is an expensive resource. Managing how we use our water is beneficial financially but also from a sustainability perspective. CUH water is managed on site by CUH maintenance Department and is overseen by HSE estates. There is a main Cork City Council water meter at the front gate of the campus; with 5 sub meters on site that are manually read.

Water Users & High Water Users

- Water is used through the campus in the delivery of patient care, by patients, staff, visitors and members of the public.
- Users of water in a typical acute hospital and applicable to CUH are outlined hereunder

Typical Users & high Water Users

- Boiler House/HVAC 50%
- Toilets/sinks/showers/baths 20%
- Catering services 15%
- Dialysis/sterile services 15%

- Laundry service 5%

High Water Users

There are three large Reverse Osmosis Plant RO plant in CUH which provide RO water for essential healthcare needs. These are

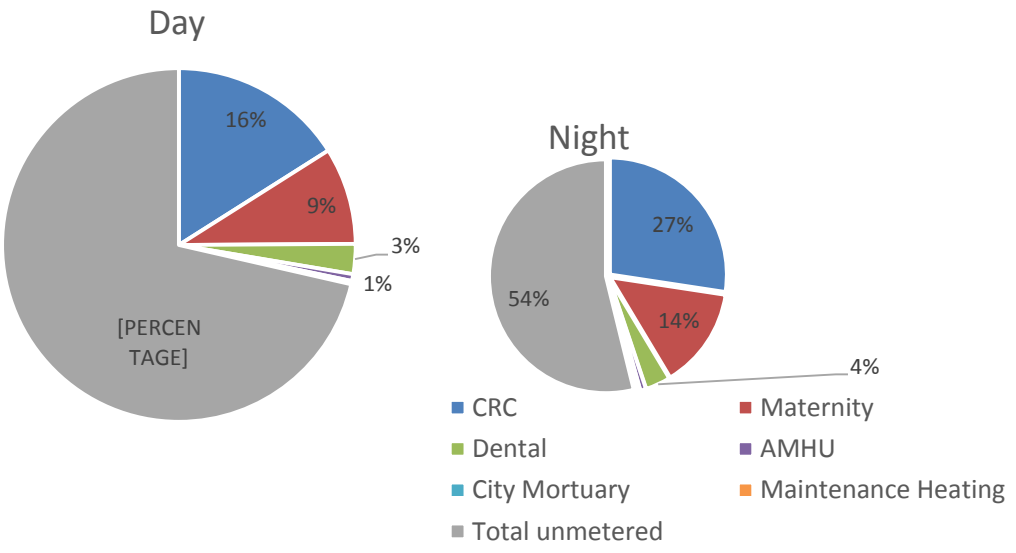
- Renal Dialysis Service with 92 to 97% water rejected as grey water
- Laboratories Departments
- Hospital Sterile Services Department (HSSD) - clean steam and RO for disinfecting reusable invasive medical devices
- In addition there are local RO plant for washing and high-level disinfection of flexible endoscopes located in
- HSSD
- Endoscopy Unit

Water Survey

- A detailed water study was carried out in Cork University Hospital in May/June 2016 as part of the Green Healthcare programme.
- The aims of the study were as follows:
- To collect baseline water consumption data for key areas of the hospital using existing sub-meters
- To carry out a targeted assessment of water fixtures examining appliance type, flow rate and hot water temperature and compare these with best practice values
- Based on the above, identify key areas for water conservation and improved sub-metering
- The data captured below summaries the results of this survey.

Water Consumption

Figure 3-30 Day and night water meter capture rates (City mortuary meter results combined)



The high proportion of night-time consumption captured is likely due to the continued activity of the CRC and maternity hospital meters while many of the other hospital areas would be much quieter than during the day. This is reflected in the much higher proportion of un-captured water use identified during the day. This suggests that much of the un-captured water is being consumed in areas which are busy during the day (e.g canteen and kitchen areas).

Hourly consumption rates for day and night were calculated based on the twice daily meter readings taken during Week 1 (Figure 2). It is important to note that the days values reflect 7 hours between 9:30 am – 4:30 pm and night-time values are for the other 17 hours.

Figure 3-31 day/night consumptions

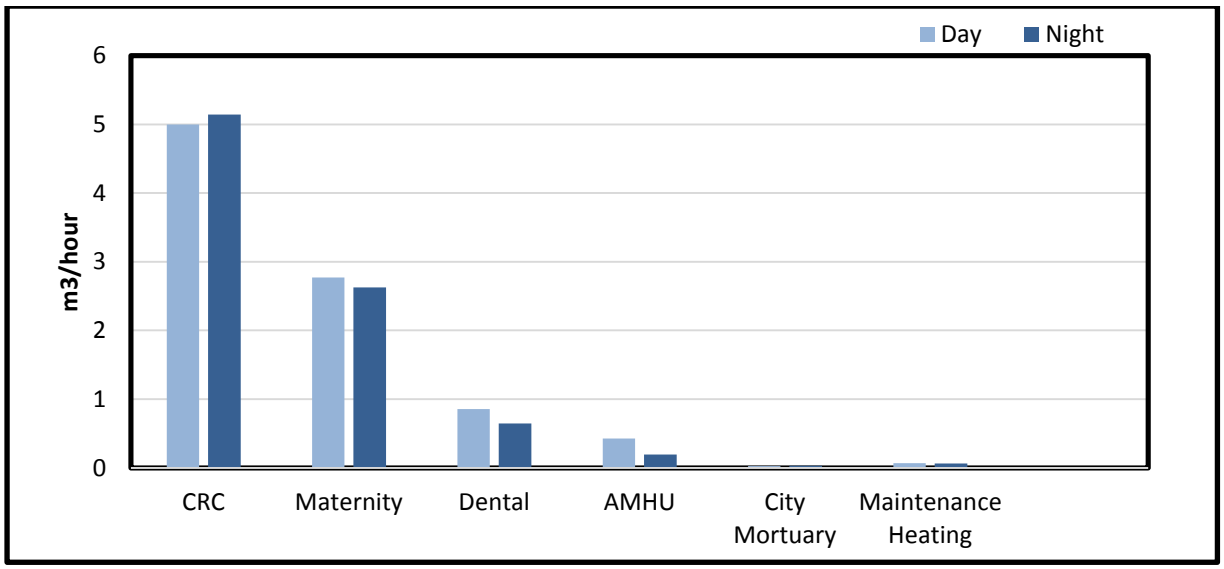


Figure 3-31 above shows that generally water consumption is slightly higher during day-time, as expected. It is likely that a much larger difference between day and night consumption rates exists but this was not captured by this study due to the times at which the meters were read.

Hourly consumption rates for day and night were calculated based on the twice daily meter readings taken during Week 1 (Figure 2). It is important to note that the days values reflect 7 hour Mains Supply

The meter readings for the mains supply are available on meters.ie. These data were used to calculate total consumption for the site.

From Monday to Friday, water consumption trends remain relatively uniform. There are two day-time peaks in water consumption, one in the morning (approx. 8 – 11 am) and one in the afternoon (approx. 2 – 5 pm). The weekend profiles are similar, in terms of

peaks and trends, though the peaks are smaller and over a shorter period than during week days.

Of particular note from the data is that background water consumption never drops below 10 m^3/h (Figure 3-33). This background water consumption is equivalent to ~€585 a day or ~€214,000 annually.

Figure 3-32

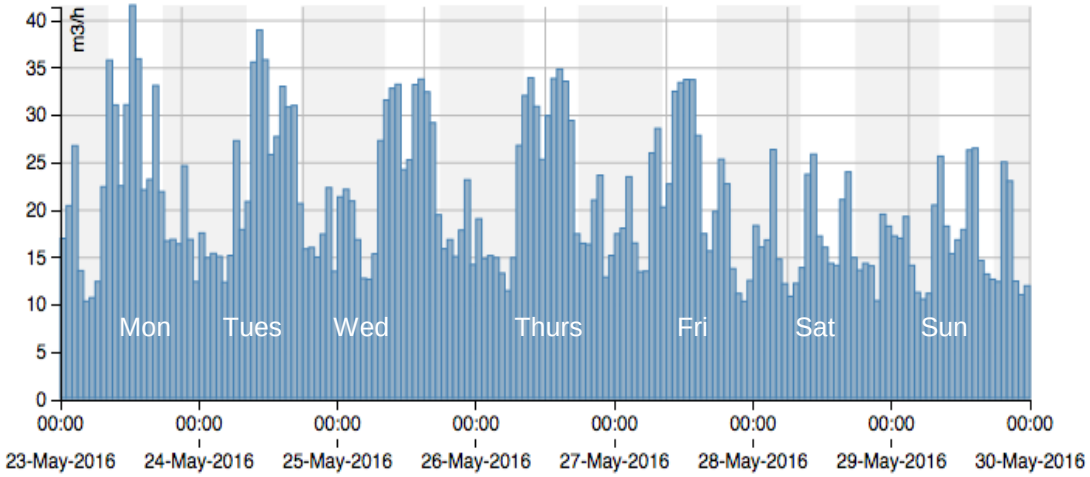


Figure 3-33 Water consumption versus bed days and costs 2014-2017

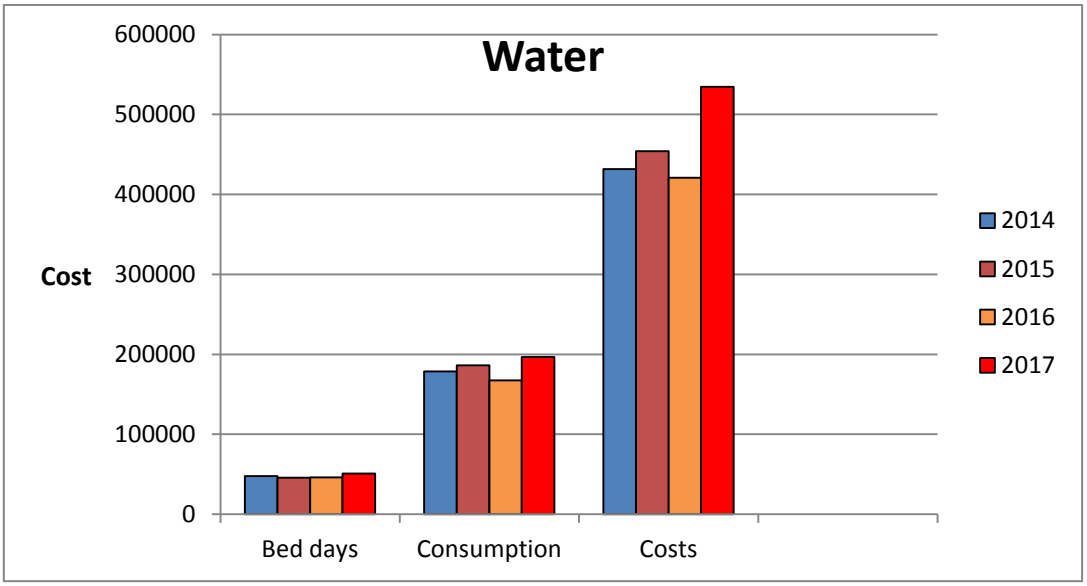


Figure 3-33, shows the total water consumption and costs and bed days from 2014-2017. There was a spike in water consumption and costs in 2015 due to a leak. Another major leak was also detected in December 2017 See information below on 2015 leak.

The leak detection company Low flow carried out a full site wide leakage survey due to a major leak being identified by the main input meter and the Cork City Council.

This leak existed onsite for a total of 13 days.

Estimated Cost of Leak:

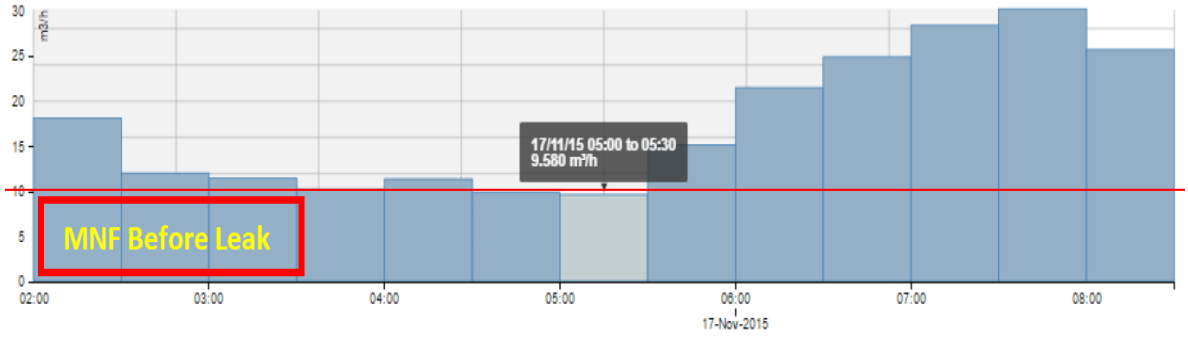
We have estimated the cost of the leak on this section as follows:

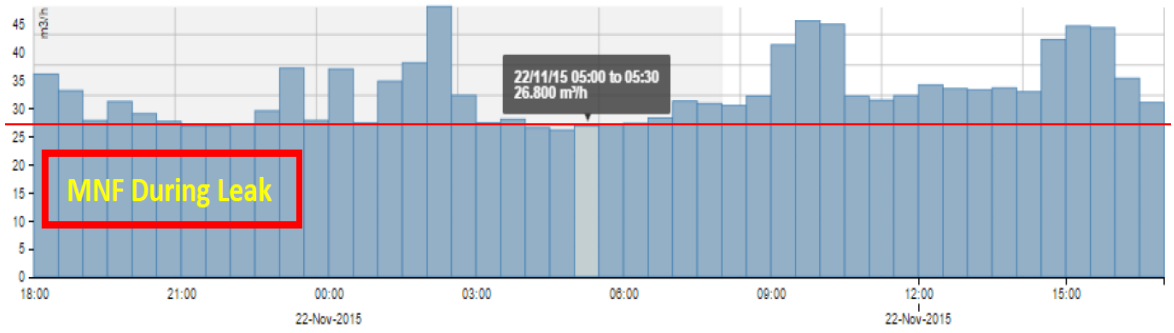
17.3m3/hr = 288.33litre/min = 415,195 litres per day

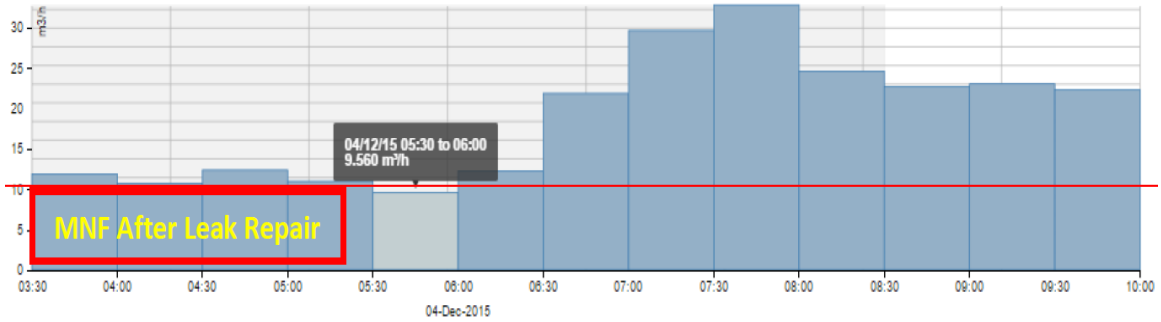
Costing: €2.44* per 1000litres or 1m3

= ~€375,000 per annum

* Cork City Council Water combined charge = €2.44/m3







The leak repair reduced the site usage significantly, bring the MNF(Minimum night-time flow) from an average of 27m3/hr to 10 M3/hr.

Main Ward block

The metering at the time of the study was found to be faulty. The main block is likely to be the single largest user of water on site comparable to that of the CRC building. It is estimated to use 25%- 30% of the overall hospital supply.

Figure 3-34

Percentage of total consumption	25%-30%
Average weekly water use:	887.67 m^3
Average hourly consumption rate (day):	5 m^3
Average hourly consumption rate (night):	5.14 m^3

Cork University Maternity Hospital (CUMH)

As expected, the maternity hospital is a large user of water and accounted for 14% of the total hospital water use during the period of the survey. The high water consumption shows only slight variation between day and night and this is consistent with the continual activity in this part of the hospital. Again, it is important to note that the day and night times noted here refer to the 7 and 17 hours respectively.

Figure 3-35

Percentage of total consumption	14%
Average weekly water use:	447.67 m^3
Average hourly consumption rate (day):	2.77 m^3
Average hourly consumption rate (night):	2.62 m^3

Acute Mental Health Unit (AMHU)

Water consumption for the recently opened AMHU is automatically logged every 15 minutes through the Building Management System (BMS). Readings were provided by the CUH Maintenance Dept from the BMS for the period.

Figure 3-36

Percentage of total consumption	1.4%
Average weekly water use:	43.5 m^3
Average hourly consumption rate (day):	0.43 m^3
Average hourly consumption rate (night):	0.19 m^3

Cardiac Renal Centre (CRC POD)

The CRC is the largest single consumer of water included in this study with 28% of total hospital water use. According to these results, water consumption is consistent between

day and night. This result could be due to the scheduling of meter readings, the continual use of reverse osmosis (a known large user) .

Percentage of total consumption	28%
Average weekly water use:	887.67 m^3
Average hourly consumption rate (day):	5 m^3
Average hourly consumption rate (night):	5.14 m^3

City Mortuary

The City Mortuary is an area of the hospital that is no longer in regular use. It has 2 meters which, interestingly, both log almost exactly the same amount of water use every day.

Figure 3-37

Percentage of total consumption	< 0.1 %
Average weekly water use:	2.58 and 2.52 m^3
Average hourly consumption rate (day):	0.013 and 0.013 m^3
Average hourly consumption rate (night):	0.015 and 0.0.14 m^3

Even though the building is used infrequently, there is almost no variation in the hourly rate of water consumption. This would suggest a water leak.

UCC Dental Hospital

At almost 100 m^3 per week, the UCC Dental hospital is the third highest consuming area included in this study.

Night consumption in UCC Dental Hospital is higher than expected. The building typically consumes 0.65 m^3/hour at night. This is 75% of the day time consumption rate. Considering that the dental hospital operates primarily within typical office hours (9 am and 6 pm) this level of night-time water consumption is notably high.

Percentage of total consumption	3%
Average weekly water use:	99.33 m^3
Average hourly consumption rate (day):	0.86 m^3
Average hourly consumption rate (night):	0.65 m^3

Water Fixtures

The second part of this study consisted of a hospital wide survey of water fixtures. The different types of fixtures (e.g. tap, shower or toilet) water consumption/flow rate and hot water temperature (where applicable) were recorded. The different fixtures were grouped based on type (distinguished visually) and each type was assigned a code.

Due to the nature of working in a fully operational hospital, not all fixtures could be assessed. However, efforts were made to gather a reasonable sample for each area within the hospital.

It was initially planned to analyse the results and use the findings, in conjunction with the building plans, to estimate the total fixtures waste use of the different areas of the hospital. However, due to the wide range of fixtures used, and the inconsistent flow rates measured (even within individual fixture types) it was not possible to get a statistically satisfactory scale up factor. Instead, the data have been examined for the different areas and, where possible, total water use has been estimated.

Toilet cistern size and tap and shower flow rates have been compared to best practice values as recommended by Green Healthcare.

CUH occupies a large campus that has grown over almost 40 years. As a result, the water distribution network is complex with a variety of different water fixtures used throughout the hospital. Flow rates also vary throughout with the same fixtures having variable flow rates depending on location.

Overall, there appears to be significant potential for CUH to save water through flow reductions in taps and showers. A number of key areas to consider are:

- Utility sinks – in general very high flow rates (many over 20 l/min) and high temperatures over 65°C).
- Hand washing sinks – very variable flow rates with many over 20 l/min.
- High flow rates obviously use more water than required but also increase splash and flooding. Many sink drains could not handle taps at full flow.

The majority of toilets in the hospital were installed with the cistern behind the wall and so these could not be assessed for water efficiency.

Results per area

Cardiac Renal Centre

The fixtures in the relatively new CRC are very uniform when compared with the rest of the hospital. The centre is fitted almost exclusively with 2 types of sink. A utility sink (labelled here as S1) and a hand wash sink (S2).

S1 sinks were found to have high flow rates (over 20 l/min on average) and very high temperatures.

Figure 3-38

S1	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold	8 - 30	21	
Hot	8 - 30	24	
Comment	Flow rates some of the highest of all fixtures. Should be reduced significantly and the temperature of hot water should be reviewed		

S2	Flow Rate Range (l/min)	Average flow rate (l/min)	
Mixed	3 - 10	6	
Comment	Good flow rates in general. Some of the higher ones should be lowered to less than 5 l/min		

Cork University Maternity Hospital (CUMH)

S3 is the label given to the most common tap type found in CUH. This elbow operated tap, which is very common throughout CUMH, is used in both utility sinks and hand washing sinks throughout the hospital. A wide range of flows were measured for this fixture in the CUMH but, for the most part, this tap has overly high flow rates. Flow rates of these types of fixtures should be reduced. Fitting in-line restrictors or adjusting supply pressure is likely the most cost effective short term solution.

Figure 3-39

S3	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold	9 - 40	22	
Hot	9 - 30	18	
Comment	The worst performing fixture in the hospital.		

The elbow operated TMV taps found in the ward sinks (S4) typically had much better flow rates. These mixer taps could be a good alternative to the high flow S3 elbow-operated taps.

Figure 3-40

S4	Flow Rate Range (l/min)	Average flow rate (l/min)	
Mixed	2 - 15	7	
Comment	Good flow rates in general. Some of the higher ones should be lowered to less than 5 l/min		

Hand washing sinks measured in private toilets were almost exclusively of one type (S5). Although its flow rate is not as low as some of the other mixer taps, this small TMV tap has low flow rates.

Figure 3-41

S5	**Flow Rate Range (l/min)**	**Average flow rate (l/min)**	
Mixed	1 - 10	6	
Comment			

The sensor operated hand wash sinks in the maternity hospital (S6 and S7) were the best performing fixtures measured in CUH. Both types had an average flow of approx. 3 l/min. S7 performed slightly better and typically had a shorter run time (average 6 seconds versus 30 seconds for S6).

It was noted in some of the CUMH public bathrooms that the motion sensors were over-sensitive. The motion of someone walking into the room was enough to turn on the tap.

The sensor operated hand wash sinks in the maternity hospital (S6 and S7) were the best performing fixtures measured in CUH. Both types had an average flow of approx. 3 l/min. S7 performed slightly better and typically had a shorter run time (average 6 seconds versus 30 seconds for S6).

It was noted in some of the CUMH public bathrooms that the motion sensors were over-sensitive. The motion of someone walking into the room was enough to turn on the tap.

Figure 3-42

S6	**Flow Rate Range (l/min)**	**Average flow rate (l/min)**	
Mixed	1 - 10	3	
Comment	Automatic run time - 30 sec		

Figure 3-43

S7	Flow Rate Range (l/min)	Average flow rate (l/min)	
Mixed	1 - 10	3	
Comment	Automatic run time – 6 sec Lowest water consumption of all fixture types in CUH		

3.9 Emergency Department (ED)

Toilets in the ED are mostly fitted with separate screw taps (S8/S9) in hand washing sinks. These older taps have very variable flow rates with many of them far exceeding recommended flows.

Figure 3-44

S8/S9	Flow Rate Range (l/min)	Average flow rate (l/min)	 
Cold Hot	4 - 25 2 - 16	10 8	
Comment			

Outside of the toilets, S3 is the most common sink type found in the ED. In the cubicles it has uncharacteristically low flow rates for this fixture – 5 l/min or less for hot and cold flows. The S3 sinks tested elsewhere in the ED had much higher flow rates, similar to other locations in the hospital.

Figure 3-45

S3	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold Hot	5 - 20 5 - 15	14 11	
Comment	The low flow rates in the ED cubicles may be due to a lower supply pressure. This should be further investigated.		

Main Ward Block (MWB)

The main ward block has a very wide variety of water fixture types and showed very little consistency in flow rates, between taps of the same type or those in the same area.

The most commonly measured sink in the MWB was labelled S4. This sink usually has good flow rates of 4-6 l/min.

Figure 3-46

S4	Flow Rate Range (l/min)	Average flow rate (l/min)	
Mixed	2 - 10	5	
Comment	A much better performing elbow operated tap than S3.		

S3 utility sinks were also widespread in the Main Ward Block where they had flow rates of up to 40 l/min. These high flow rates, especially in ward rooms, can contribute to increase splashing of patients and floors which is a potential hazard for patients.

Figure 3-47

S3	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold Hot	8 - 40 8- 30	18 17	
Comment			

Many of the sinks in the bathrooms adjoining the wards were of one type (S10).

Figure 3-48

S10	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold Hot	15 - 40 15 - 35	25 20	
Comment	Very high flows and temperatures.		

These sinks all have excessively high flow rates and are not fitted with TMVs and so deliver water at approx. 60 °C. As these sinks are used by patients for hand washing there is a scald risk as well as a splashing issue.

Acute Mental Health Unit

AMHU is the best performing area in the hospital in terms of sink flow rates. All hand washing sinks tested in the building were under 6 l/min. Utility sinks had flow rates of 12 – 20 l/min. Several of the fittings in the AMHU are motion sensor operated. These have automatic run times of just 2 seconds.

Nurses Residence, Doctors Residence and Occupational Health

These older buildings are fitted mostly with separate screw taps in hand wash basins. The flow rates in this building were quite variable despite the uniformity in water fixture type.

Figure 3-49

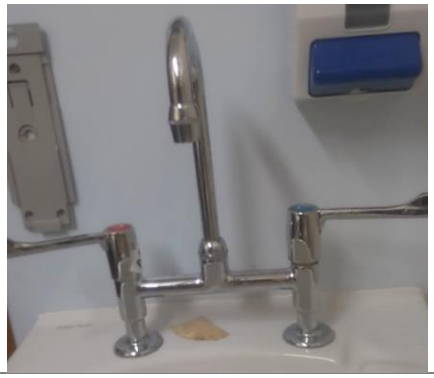
S11	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold	2 - 16	10	
Hot	5 - 20	10	
Comment	Even with uniformity of fitting used the flow rates vary. This should be investigated as it may provide an easy way to adjust flow rates throughout (e.g. if restrictors are used)		

Theatres

Scrub sinks had flow rates of 4-10 l/min. Some of the new motion sensor sinks measured had low flow rates but automatic run times almost two minutes.

S3s are used in the theatre prep and dirty utility areas. Common with other areas throughout they have excessively high flows.

Figure 3-50

S3	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold	5-30	14	
Hot	8-30	17	
Comment	Excessively high flow rates		

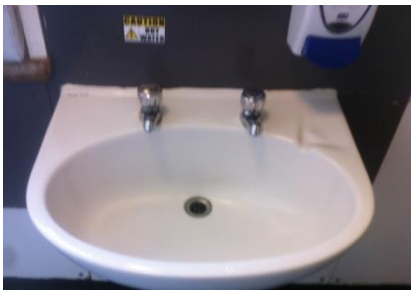
It is important to consider that the high flow rates in the utility sinks in theatres may be necessary for the work carried out in these areas.

Outpatient Department (OPD)

S3 taps are fitted on all hand washing sinks in clinical rooms in OPD. The hot and cold tap flow rates all measured ~ 35 l/min. These should be reviewed straight away and provide a significant potential for water conservation.

The hand washing sinks in the toilets of the OPD were S9 types and had variable flows.

Figure 3-51

S9	Flow Rate Range (l/min)	Average flow rate (l/min)	
Cold	3 - 20	11	
Hot	1 - 30	14	
Comment	Extremely variable flow rates		

The extent of the variability of flow rates among the same fixture in the OPD is given in figure 3-52 For example, in the Black water suite, the hot taps in the 2 adjacent public toilets have recorded flows of 1 l/min and 30 l/min.

Figure 3-52 Detailed flow rates for public bathrooms in OPD

Suite	Flow rate cold	Flow rate hot
Lee	15	15
	12	15
Bandon	10	2
	5	6
Blackwater	0	30
	3	1
Awbeg	8	14
	9	9
	10	25

Water Conclusion

CUH monitors water on meter.ie and scrutinises the bills to ensure accuracy. The water consumption has reduced over the last number of years with the water use per patient bed day reducing from 729litres to 700litres from 2015 to 2016. With effective water initiatives such as changing showers heads and installing water meters, the hospital expects to see a further reduction in the next 3 years.

3.10 Main Theme-Biodiversity

Introduction

Cork University Campus is 40.3 acres with approximately 6 acres of green spaces. There is a specific contractor that is responsible for the upkeep of these external green spaces. In recent years the campus has expanded limiting the amount of green spaces. In light of this it is important to CUH to develop the green spaces externally and internally. The hospital is proud of the contribution its gardens makes to the local environment and overall biodiversity of the area, and is committed to safeguarding and enhancing this through its participation in Green Campus and development of the biodiversity theme.

The Hospital had been making biodiversity improvements across the campus as evidenced by its Landscape Management Plan which outlines how all the various areas such as meadows, and grass areas are managed onsite. Maintenance of biodiversity is at the root of this plan.

External Green spaces

CUH has 6 acres of green spaces on campus, there are two meadowland areas identified which are cut yearly to encourage growth and pollination. The green spaces on campus are maintained regularly and used by staff and visitors to the campus.

Figure 3-53

Natural walkways

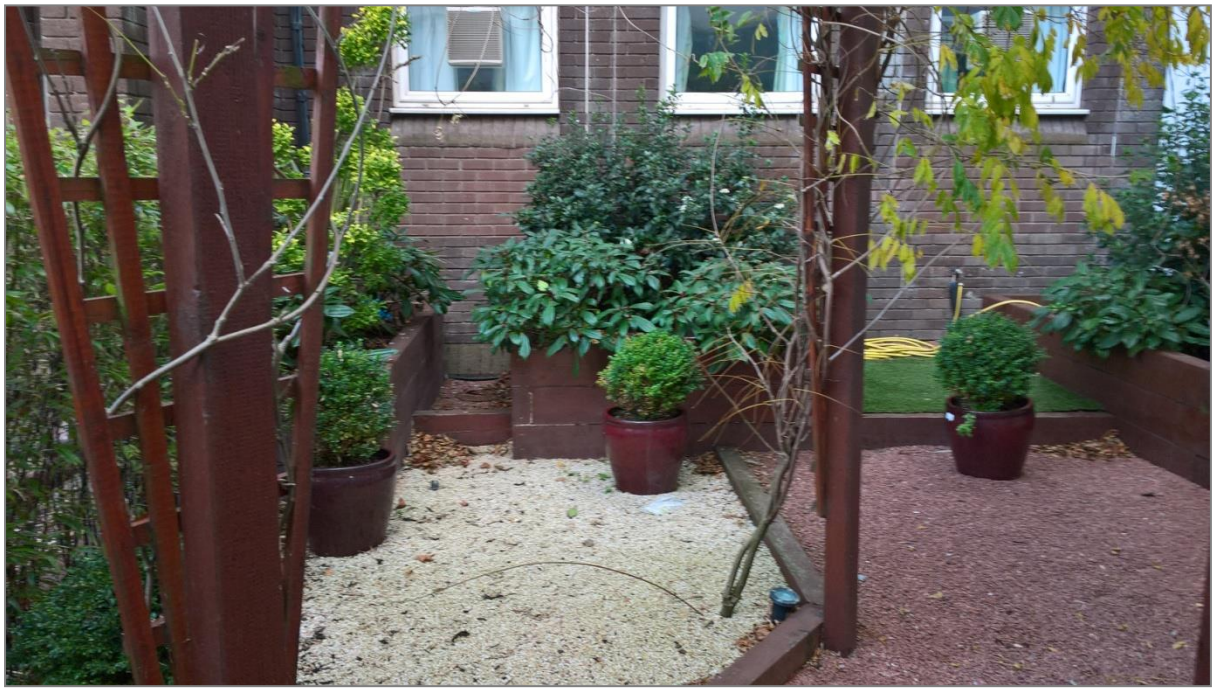
The campus has a huge amount of natural pathways and beautiful walks along the back of the hospital where there are trees giving shade with lots of green areas. These areas are often used by staff for relaxing on lunch breaks. CUH plan to get involved with health promotion and Sli Na Slainte to have clear signage on the walkways around the campus.

Figure 3-54

Japanese garden

This garden is located by GB ward and was created back in 2012, the garden while cannot be used was designed so patients on the oncology ward quiet room can look out on to this small space and feel at ease. It is for aesthetic purposes only.

Figure 3-55



CUMH Garden

CUMH gardens were developed in 2009, this garden has beautiful life size daisies with sitting area for patients. Looking from the windows above it is a beautiful space. There is a re-development plan being considered for 2018. The garden remains closed to staff and visitors.

Figure 3-56

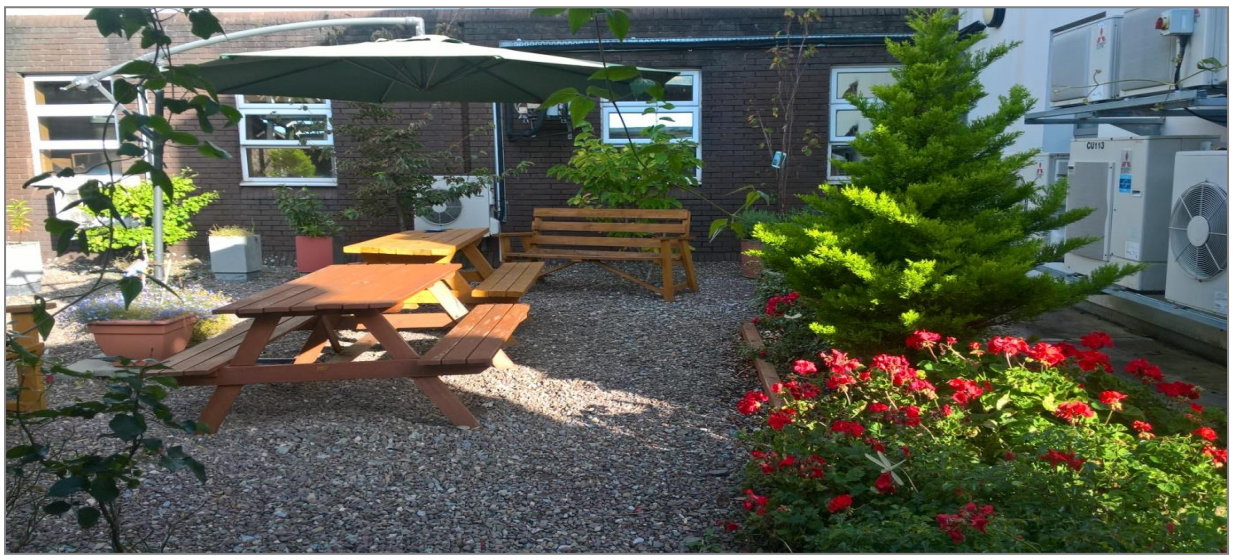
INTERNAL GARDENS

Radiology garden

Radiology garden has developed over the last number of years with the forming of a Radiology Garden Group. Raj and Marek, have taken pride in everything from pots to the raised beds. The staffs use this space to get some fresh air and enjoy the sun when it's shining. This garden is currently home to a fish pond that is belongs to Paediatrics. The pond is looked after by one of our porters and it adds to this beautiful Radiology Garden. The Radiology Department hope to expand the garden in 2018, with new benches and outdoor lighting.

Figure 3-57

Figure 3-58



Emergency Department (ED) Courtyard gardens

The accident and emergency department have two gardens one for patients in the Clinical Decision Unit (CDU) and one for staff. The garden group in this area was set up a

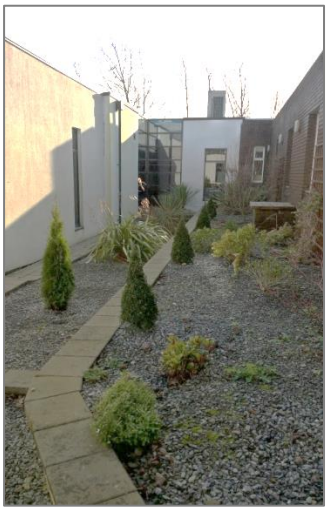
few months ago. The ED Garden Group consists of Anna Dillon, CNM2 and other ED staff. The gardens have decked courtyards with large pots and a bench for patients to sit out and get some air. The courtyards are visible by both staff and the public, showing how we have utilised our small outdoor spaces.

Figure 3-59

Medical Records Garden

The garden was created when the new medical records building was built in 2007. The garden group was set up in 2016 and since they have added new plants such as clematis. It is a place where clerical staff, nursing staff from infusion and diabetic clinic staff can relax and enjoy their lunch outdoors. This year with the help of new members, the medical records garden group wish to add to the garden with more shrubs.

Figure 3-60



Maintenance courtyard garden

The head of maintenance started this project 3 years ago. The area which was once just a concrete entrance into maintenance department was transformed into a courtyard garden with hanging baskets, window boxes and benches where staff and contractors could sit and enjoy the area.

Figure 3-61

Physiotherapy Courtyard

Physiotherapy courtyard is looked after by the staff, it was set up early 2017 It is used by the staff to sit out and enjoy the sun shine. Maintenance painted and created large wooden beds where there have been many different shrubs planted. The team have also been able to harvest lettuce, scallions, radishes, peas and herbs. The team saw that other gardens were being developed around the campus. One of the staff read an article in the Examiner on the health benefits of planting / greenery in the workplace. Frances the physiotherapy manager is a keen gardener. Apart from the benefits of having a fresh air space to sit out, it's beautiful to see the colours and movement of the plants from indoors when we don't get out.

Figure 3-62

Self-sustaining internal gardens

In CUH there are many smaller gardens which may not be accessible to staff and public but have potential to be self-sustaining and easy on the eye. This November CUH steering group are looking the possibility of up cycling crutches and using them to make sculptures in these gardens. These gardens are located throughout the hospital and are tidied annually. All plants here are evergreen and are self-sustaining. The picture below shows a garden located between theatre and stores corridor. Also pictured below is a typical courtyard which could be used for the up cycling project, such as waste crutches or perhaps waste metal.

Figure 3-63

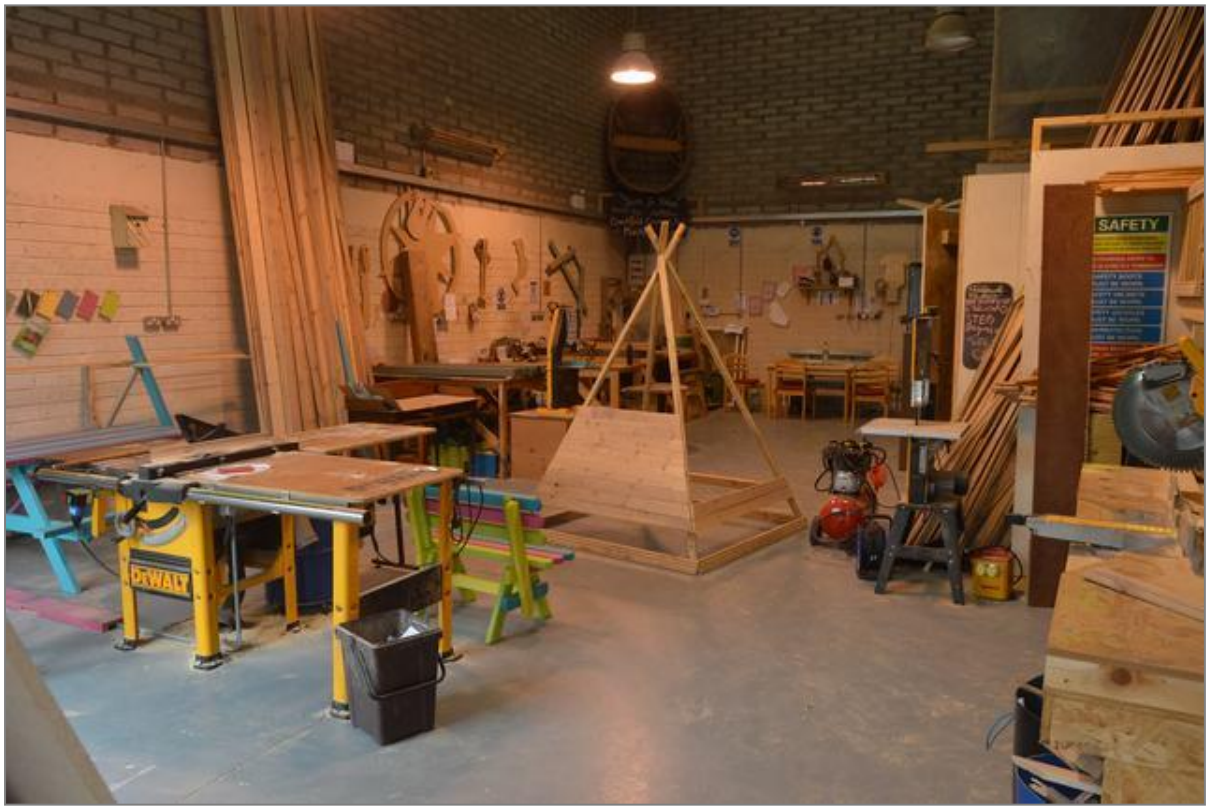
Figure 3-64

Bird boxes and bat boxes

There are many different types of birds on campus and the odd few bats. The green campus committee decided that bird boxes and bat boxes would enhance the biodiversity within the grounds of CUH. Churchfield Community Trust which offers training, work and enterprise skills to disadvantaged young men in the North side of Cork with particular focus on adult education, woodwork, catering skills and horticulture. They took on the project of providing bird boxes and bat boxes to CUH. The skilled individuals can gain long term work after this training which in turn helps to get them back into the work place. The bird boxes are situated along the natural walkways at the on the back of the hospital grounds with the bat boxes located on an outer building where there are trees and it has variety of shelter.

Figure 3-65

Figure 3-66



Bio-Diversity off site

Churchfield Community Trust grow fresh produce off site that is supplied to the catering department in CUH. This project again involves the individuals learning the skills of horticulture while encouraging bio-diversity on the Farrenferris site on the north side of Cork. The site not only grows produce for CUH but also sells local to the community fresh tomatoes, strawberries and seasonally produce throughout the year. The site has also wild meadows with flora and fauna encouraging the bees on site to encourage pollination. The produce keeps growing year on year and local food procurement has proven a huge success with both patients and staff within the hospital.

Figure 3-67

Figure 3-68

Biodiversity Conclusion

Biodiversity is extremely important to CUH. The campus is continuously expanding and developing. Expansion can lead to loss of green spaces. All building and infrastructure developments are assessed having regard to their impacts on the campus landscape. The biodiversity can progress and develop through initiatives such as the garden groups and development of all internal courtyard spaces. The Cork University Hospital takes great pride in its landscape setting and the resultant attractive environment for the campus community and public. Offsite growing will encourage people to think about growing initiatives on site in a smaller scale. Natural walkways can be developed and mapped to get people interested in the local birds and bats that have decided to move in. CUH plan to increase awareness of bio-diversity among staff by promoting growing on site by Catering Department in 2019 and run a course for all staff promoting how to grow their own food at home.

4 Action Plan

CUH Action Plans

Actions are organised under the action plan and goal oriented with key performance results / deliverables and a task owner. Action steps are developed from audits, surveys and specialist reports as well as staff suggestions and ideas. The Sustainability/Energy and Waste Registers of Opportunities also feeds into the action plans. Action Plan items are tracked, monitored and evaluated regularly via various hospital management committees including the Sustainable Healthcare Group.

Action Plan Objectives:

The 2017/2018 action plans objectives are

- To work towards achieving the National energy reduction target.
- To ensure better control and measurement of energy, water costs and consumption and waste management costs.
- Optimise energy performance of equipment on the CUH campus.
- Ensure a good sustainable environment and encourage biodiversity.

Sustainable Healthcare/Environment Programme Action Plan

Legend: *Senior Management Team SMT: Executive Management Board EMB: Sustainable Environment Steering group SESG: Sustainable Environment Officer SEO: Waste Officer WO: Office Public Works OPW: Catering Manager CM: National Transport Authority NTA: Clean Technology Centre CTC: Church field Community Trust CCT: Portering Manager PM.

4.1 Action Plan 2017

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
Governance	Seek approval for energy manager	Demonstrate commitment to progressing energy projects	1 Year 2018/2019	EMB/Estates	
Awareness campaigns	Continue awareness campaigns on all elements	Support managers and staff in identifying improvement measures to manage energy, waste & water in their departments	2 year programme 2019	WO/SEO	
	Energy Champion monthly meetings	Keep momentum with Optimising Power @ work initiative	2 year programme 2019	SEO/Estates	
Education	Energy Awareness day in canteen	Energy awareness day 2017 to be repeated in 2018	2018	SEO/OPW	
	Update website information	Update web pages with new green campus newsletters bi-monthly and any events or information on campus	2018	SEO	
	Update notice board with new awareness posters	Informing staff and communication	2018	SEO	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
Energy	Sub metering on campus/ software system to correlate information.	Reduce consumption with exact information on high usage areas	2018	OPW/SEO/Estates	
	Monitor and report on energy consumption and costs	Support line managers and energy champions in reducing the energy consumption	Jan/Feb 2018	OPW/Estates/SEO	
	Energy saving target of 33% by 2020	Verify bills and improve consumption, through local discussion with line managers	1 Year 2018	Estates/SEO/OPW	
	Reduce energy consumption	Reduce energy consumption on campus by 8% by end of 2018	2018	SEO/Estates/OPW	
	Car park lighting upgrades	Seek funding for car park lighting upgrades	3 years 2021	SEO/OPW/Estates	
	Pump upgrades in plant rooms	Upgrade pumps in 5 plant rooms capital of 200k needed.	3 years 2021	Estates/SEO	
	Introduce Carbon Energy Fund	Expertise in delivering ESCO type projects required to meet energy targets.	3 years 2021	Estates/SEO	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
Waste	Reduce waste volume and poor segregation	Staff training on waste segregation and generation of waste	1 year 2018	WO/SEO	
	Reduce generation all waste types	Reduce waste from all stream in line with EPA benchmarks through training and awareness	2 years 2019	WO/SEO	
	Recycling Drive	Roll out recycling awareness in line with new waste contract	1 year 2018	WO/SEO	
	Waste surveys	Monitor waste by carrying out weekly surveys	1 year 2018	WO/SEO	
	Reduce food waste	Monitor food waste through benchmarking against in patient bed days to improve volume and cost	1 year 2018	WO/SEO/CM	
	Energy Recovery waste stream	To educate more departments on energy recovery waste stream once new contract in place	2018	WO/SEO	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
	Ban disposable cups	Introduce crockery cups, keep-cups, change to compostable cups and charge accordingly	2019	SEO/UCC/CIT	
Clinical Waste	Bio-systems (reusable sharps bins)	Investigate bio-systems to reduce the one use sharps bins to see if it reduces costs	2018	WO/SEO	
	Survey the HCRW in highest producing areas	Survey the health care risk waste bags to see if in fact all of the soft waste in clinical	2018	WO/SEO	
Training and Education	Clinical Waste Awareness day	Refresh all staff on clinical waste segregation facts.	2018	WO/SEO	
	Local training sessions	Local training sessions in place , introduce mandatory sessions twice yearly for all HCRW handlers	2018	WO/SEO	
	Review medicine disposal in Pharmacy	Procedure in place waiting HSE policy document.	2018	SEO	
Transport/travel	Mobility management plan 2018	Complete survey this year to determine actions	2018	Estates	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
	Electric vehicles	Replace one vehicle with electric vehicle	2018	SEO/PM	
	Electric car charging units	2 units to be installed	2018	Estates	
	Carpooling app with UCC	Promote carpooling onsite and link with other sites, more users	2018	SEO/UCC	
	Onsite bikes Survey	Survey staff to identify the possibility of onsite bike availability	2018	SEO/UCC	
	Campus bike week bike buddy scheme	Roll out bike buddy scheme in CUH teaching people to use their bike safely building confidence to cycle to work	2018	SEO/UCC/CIT	
Travel/transport cont	Shuttle service through tunnel	Collaborate with NTA in providing a shuttle service through Jack Lynch Tunnel reducing traffic congestion	2021	SEO/NTA	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
	Shuttle service from Kent Railway Station	Link the campus directly to the main railway station, encouraging staff to use public transport. Currently campus linked with bus 205 however there are 8 stops before it reaches CUH campus	2018	SEO/NTA	
	Enhance on site services	Continue to improve on site facilities for pedestrian's staff, visitors, cyclists and vulnerable users, both staff and visitors. New shower facilities, speed signage to reduce speeding onsite	2021	SEO/Estates	
	Bicycle User Group	Twice yearly round table discussions	2018	SEO/UCC/NTA	
	Tax saver scheme	Continuously promote the tax saver scheme throughout the year	2018	SEO	
Water	Monitor and measure and reduce water consumption	Monitor and measuring water through meter.ie	2017/2018	Estates/SEO	
	Develop and set up water awareness	Educate staff on water	2018	SEO/Estates	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
	campaign	consumption and costs in their areas			
	Sub metering	Data loggers to be fitted to existing water meters to gain accurate readings to monitor and control.	2 years 2019	Estates/SEO	
	Change shower heads	Change shower heads hospital wide to reduce flow from 22litres to 7 litres per minute	2 years 2019	Estates	
	Upgrade taps on campus to reduce flow	Taps identified on site with excess flow levels need to be changed to reduce flow of water to acceptable level.	2 years 2019	Estates	
	Autoclave project	Review water savings when all machines are fitted and in full operation	2018	SEO	
	Main ward block review	Main ward block step test to ensure no leaks are detected	2018	Estates	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
	R/O system	Design system to capture the rejected water from the RO supplying dialysis.	3 years 2021	Estates	
Bio-diversity	Staff walkways	Map campus walkways giving details on steps, km, approx. times and trees expected to see on the route and encourage staff to use them	2018	Estates/SEO	
	Grow your own project	Run a course for staff and educate them on how to grow their own produce.	2018	Estates/SEO	
	Self- sustaining gardens	Tidy up drive for internal gardens in Spring get staff involved.	2018	SEO	
	Courtyard art	To create and design crutch art for internal courtyards	2018	SEO/Estates	
	Pink wall project	A pink painted wall been identified in OPD. The steering group wish to have green campus art painted on this wall. The arts	2018	SEO/Arts Co-ordinator	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
		co-ordinator is looking for an artist to take on the project			
	Catering Herb garden	To develop this herb garden area to have fresh herbs used daily in the Catering Department	2018/2019	SEO/CCT	
	Food Procurement	Church-field Community trust project to produce more fresh food for the Catering Department next year.	2018	SEO/AC	
	Coffee grains as compost	Use the waste coffee grains from the canteen as compost on-site	2018/2019	SEO/CM/ CCT	
Pilot Projects	Catering Department will be part of pilot in 2018	Introduce sub-metering for water, and energy reduction and tracking for waste reduction. Encourage all areas of the hospital to get involved in their own areas.	2018/2019	SEO/CM/WO/Estates	

Improvement Area	Actions	Key Result/Deliverables	Timescale	Responsibilities	Status
Link to learning	Carry out campus student survey on sustainability awareness.	Surveying 4th Year nursing students on sustainability awareness will gauge the knowledge on CUH campus of waste and sustainability	January 2018	SEO	
	Plan student field trips on sustainability on campus.	Students need to see how sustainability works with field trips on-site to show waste steams to trips off-site to see Church-field food procurement.	2018	SEO/CM/WO	
	Invite students to get involved in campus projects, grow your own initiative 2018,	Get students involved in projects, this project could be of interest to students in 1st or second year.	2018	SEO	

4.2 Action Plan 2014

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
Governance	Establish an effective energy, water and waste management system	Partnership with HSE S Estates / Estates Energy Champion / SEAI Appointment of Sustainable Environment Project Officer Job description for Sustainable Environment Project Officer	EMB, SMT & SESG	Complete
	Establish CUHG Sustainable Environment Steering Group	Sustainable Environment Steering Group in place to guide and direct programme	CEO	Complete
	Provide assurance to EMB that CUHG are in compliance with HSE Sustainable Programme	Coordinated framework in line with HSE Towards a Sustainable Health Service & HSE Strategic Plan across CUHG Compliance within available resources	SESG	Complete
	Arrange and release staff to attend SEAI Energy Map Process training	Key CUH campus stakeholders trained in SEAI Energy Map Process	SESG	Complete
	Develop the CUHG Energy/Sustainable Environment Strategy, Declaration of commitment, Policy & Action Plan in collaboration with HSE South Estates relevant stakeholders	CUHG Energy/Sustainable Environment Declaration of Commitment, Policy, Strategy Action Plan in place	SESG	Complete

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	Seek EMB / SMT approval for the Sustainable Environment Strategy & Action Plan	Demonstrated CUHG management commitment	SMT EMB	Complete
	Implement Sustainable Environment Action Plan	Agreed technical projects implemented / completed 20013 to 2014 Staff Awareness Campaign in place	SESG	Completed
	Support and enable management and operational staff to be accountable & responsible for energy, water and waste	Responsibility and accountability for sustainable environment is clear		Completed
	Monitor progress to achieve HSE targets			Complete
Organization Arrangements	Set up a Sustainable Environment Steering group.	Coordinated framework structure for implementation of HSE Energy Management Strategy 2013-2017.	SMT	Complete
	Develop Terms of Reference For Sustainable Environment Steering Group	Terms of Reference approved and in place	SESG & EMB	Complete
	Recruit Ward/ Department Green Advocates Form Sectional Green Teams Establish a Green Forum	Infrastructure Green Advocate / Team/ Forum in place	SEO	Complete

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	Establish adequate technical support from HSE South Estates Department	Dedicated Energy Champion / Coordinator appointed in the HSE South Region to support CUH campus	HSE South Estates Managers	Complete
Legislation	Compile CUH register of compliance with the most relevant standards legislation and obligations under Energy, Waste, Air, Transport and Water and any other relevant standards/legislation.	Establish that CUH are meeting their statutory obligations in terms of emissions to land, air and water.	SEO & Waste Manager,	Complete
	Improve healthcare sustainability & display Energy Rating Certification	Display Energy Rating Certification in compliance with European Directives	HSES Energy Champion & & SEO	Complete
Awareness Campaign	Develop, set up, launch and maintain staff awareness campaign and sustainable/ energy and waste register of opportunities Refer to 4.3	Staff have access to the current information and resources Support managers, staff and others in identifying improvement measures and managing energy, water and waste saving measures on wards & departments	SMT & SEO	Complete & on-going
	Develop trial and carry out Energy		SEO	Complete &

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	Staff Awareness Survey. Collate responses and comply report Utilize findings to further develop the staff awareness campaign	Successful staff energy awareness campaign		on-going
	Participate in the Green -Campus Programme Pre-registration /consultation with An Taisce Green- Campus programme Staff Register for programme Environmental Review (available data, site audits etc.) Link Green-Campus Programme to healthcare /working in healthcare Inform and involve the staff and the wider community Application for Green campus Programme & Green Flag Award Assessment / Award Annual Renewal	Achieve Green Campus award for CUH long term commitment to continuous improvement in striving to achieve a sustainable environment Recognition that staff members of CUHG community are engaged in a meaningful way to enhance sustainability in their work place	SEEG SEO	Registered 2013 Application complete submitted March 2014

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	Improve staff awareness and operating practice in all areas of activity through a variety of means Refer to 4. 3	CUHG staff are encouraged and supported in implementing change Sustainable environment initiatives are promoted and supported	SSEG & SEO	In progress & on-going
	Survey, audit and report on energy at Point of Use	Conservation and reduction in energy and water usage and appropriate segregation of waste.	SEO	Complete & on-going
Energy Conservation	Compile energy billing information; establish base line and analysis data. Review system for management of bills	Energy consumption and costs are measured, monitored and controlled Projects Charters for agreed technical projects are in place Refer to appendix I	HSE South Energy Champion	Complete & on-going
	Measure energy (electricity, gas, petrol diesel) in units, costs, sources and uses of energy			Complete & on-going
	Graph and trend data			Complete& on-going
	Report data findings to Sustainable Environment Steering Group and action.			Complete & on-going
	Carry out an Energy Degree Day analysis			Completed

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	Sustainable Environment Steering Group to monitor energy usage, costs and carbon footprint	Verify improvements in monitoring and reporting Verify energy cost savings achieve and reduction in consumption		Complete & on-going
	Populate the Energy Register of Opportunity with ideas		HSES Energy Champion & SEO	Complete & on-going
	Identify projects that can be achieved with 2013 & 2014 from the Energy Register of Opportunity Refer to Appendix 1 & 2		HSES Energy Champion & SEO	Complete
	Complete Project Charters for selected projects in 2013		HSE South Energy Champion & Engineering Officer	Complete
	Identify key locations for appropriate sub-metering. Refer to 4.2		As above	Complete
	Evaluate projects that have been completed		SSEG	In progress
	Improve healthcare sustainability & display Energy Rating Certification		HSES Energy Champion & SEO	Completed one DEC for CUH campus. Working on DEC for others

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
				areas in progress
Water Conservation & Wastewater	Compile water billing information; establish base line and analysis data. Review system for management of bills	Energy consumption and costs are measured, monitored and controlled Projects Charters for agreed technical projects are in place	SEO	Complete & on-going
	Measure water uses, sources, costs, pre-treatments required Measure Wastewater discharge quantity, costs, and destination.	Verify improvements in monitoring and reporting	HSES Energy Champion & SEO	Complete & on going
	Report data findings to Sustainable Environment Steering Group and action.	Verify energy cost savings achieve and reduction in consumption	HSES Energy Champion & SEO	Complete & on-going
	Sustainable Environment Steering Group to monitor water usage, costs and quantities			Complete & on-going
	Populate the Energy Register of Opportunity with ideas		HSES Energy Champion & SEO	Complete & on-going
	Identify projects that can be achieved with 2013 & 2014 from the Sustainable / Energy Register of Opportunity			Complete & on-going

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	Refer to 4.2 & 4.3			
	Evaluate projects that have been completed		SSEG	Started & on going
Wastes generated	Measure and monitor waste sources, types, treatment, costs, volumes/quantities, handling and storage, collection schedules	Waste costs volumes and quantities consumption and costs are measured, monitored and controlled		Completed & on-going
	Arrange and carry out Waste Survey in select areas/ wards in CUH & CUMH in collaboration with CIT CTC EPA Green Healthcare programme	Verify improvements through monitoring and reporting	Services Manager SEO & Waste Manager	Completed July/ Aug 2013
	Develop and populate the Waste Register of Opportunity	Verify waste cost savings initiates achieve	SEO & HSE S Champion	Completed July 2013
	Trial and evaluate waste reduction and bin placement measures recommendations from CIT CTC Survey in pilot areas.		Services Manager SEO,	Completed Feb 2014
	Roll out agreed waste reduction and bin placement measures across CUH & CUMH		Waste Manager &	Complete 2015
	Arrange food disposal to be Reviewed			In progress

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	by CIT CTC			
	Identify costs saving initiates that can be achieved in 2013 & 2014 from the Waste Register of Opportunity		CNMs/ CMMs/ Dept Heads	In progress
	Complete waste management improvement projects			In progress & on going
	Evaluate costs saving initiates projects that have emerged from the Waste Register of Opportunity and other sources			Complete 2013 – on going
Procurement	Procure better energy goods and supplies, energy efficiency and renewable energy services, transport, energy using products in a sustainable manner	Purchased equipment and vehicles from the Triple E register where data base exists for those items	Procurement & budget holders	In progress
Design	Improve existing healthcare buildings sustainable	Reduced operating Costs		Complete & on going
	Integrate energy efficiency in capital projects and new designs CUH Mental Health Unit	All new buildings projects will have a minimum energy building rating A3	HSE Estates	Complete & on going
	Ensure energy efficiency is paramount in the development of all new building projects for example in	Implemented energy efficiency design processes	HSE S Estates & CUH Energy Design	Complete

Improvement Area	Actions	Key Result/ Deliverables	Responsibility *	Status (March 2014)
	CUH Mental Health Unit		Review Team	
	Design new and upgrade refurbishing projects to optimize energy performance		HSE S Estates & CUH Engineering Officer	Complete & on going
Air Emissions	Establish emissions to air and mitigation measures in place		HSE Estates	Not Due
Travel	Review Travel & Transport on campus			Complete
	Carry out Staff Travel Survey Seek other opportunities			Complete 2015
Partnerships Programmes	Establish & maintain partnership with SEAI, An Taisce , UCC, NTA and CIT CTC Form new linkages and collaborations with Cities of the Future, EcCoWell, Energy Cork, Cork City Food Policy Council Seek other opportunities		SEO	Complete 2015

4.3 Action plan 2015

No.	Element	Action	Person Responsible	Status
1.	**An Taisce/Green Flag**	Submit documentation for renewal of the Green Flag in July 2015.	Edward Murphy Sustainable Environment Steering Group	Complete 2015
		Work to further develop the Green Campus programme which will be formally reassessed at CUH in 2017.	Sustainable Environment Steering Group	On going
2.	**Energy Initiatives**	Apply to Estates for separate funding for sustainability smaller scale energy initiatives in CUH.	Eric Crowe Sustainability Steering Group	Complete 2015
		Explore alternative funding mechanisms that may be available to finance Energy Action Plan 2015-2020.	Eric Crowe Finance Manager	In Progress
		Develop a technical project proposal for CUH campus for 2015.	Sustainable Environment Steering Group	Complete
		High investment opportunities and European funding to be explored with HSE Estates and SEAI. Business cases to be developed for applications for projects including CHP for CUH and re-lamping project.	Sustainability Steering Group HSE Estates Eric Crowe	In Progress and on going
		Survey for further roll out of utility metering across the campus to include water, gas and electricity.	Eric Crowe HSE Estates Maintenance Department	In Progress
		Sub-billing of utilities for third parties operating on CUH campus so that costs can be removed from the CUH energy budget.	Eric Crowe HSE Estates Maintenance Department Finance Department	In progress

		Implementation of energy action plan items following securing of funding.	Eric Crowe HSE Estates Maintenance Department	In progress
3.	**Health Care Risk Waste**	Dental Hospital risk waste tonnes and subsequent costs to be removed from CUH waste management budget.	Edward Murphy Finance Manager Dental Hospital Manager	Complete 2015
		Explore new system of sharps waste management with SRCL – identify whether system would be cost-effective.	Waste Management	Due in Q4 when risk waste contract is re-negotiated
		Reduce healthcare risk waste tonnage to levels that meet EPA waste benchmark of 1.9kg/in-patient bed day through staff education awareness.	Waste Management	On-going
		Achieve a reduction in HCRW waste tonnage to 40 tonnes/month by 2017. Progress to be reported to EMB.	Waste Management	On-going
		Carry out audits of clinical areas to ensure compliance with bin location guidance and healthcare waste segregation.	Waste Management	Complete
		Following analysis of audits carried out, target risk waste specific awareness campaigns in areas where compliance with waste segregation is poor.	Waste management	In Progress
		Investigate alternative means of treating HCRW – Site visit to UHL.	Eric Crowe Edward Murphy	Complete
		Internal audit of bin locations in order to maximise waste segregation.	Waste Management	Complete 2015
4.	**Hazardous Waste**	Review medicines disposal with pharmacy department. Guidelines around pharmaceutical disposal currently being	Waste Management Helen Maher	In progress

		drafted.		
		Train key personnel on campus in dangerous goods awareness and safety.	Edward Murphy	Complete
5.	**Recycling**	Continue to increase recycling by appropriate segregation through staff training and increasing awareness.	Waste Management	On-going
		Medium term goal – to increase recycling by a further 25-30 tonnes by 2017. Progress to be reported to the EMB.	Waste Management	On-going
		Review the possibility of up-cycling furniture and non-clinical items between different campuses.	Waste Management	Complete and on going
		Undertake project to recycle X-rays that qualify for disposal that are currently in storage in Iron Mountain.	Edward Murphy Operations Manager HSE Procurement ICT Manager Radiography Staff	In progress
6.	**Food waste**	Work with catering to reduce the amount of plate waste that is returned from the wards to the kitchen. Review of meal times, menus and portion sizes required.	Edward Murphy Catering Department	In Progress
		Undertake project around review of milk waste and milk formula waste in CUMH.		Complete
		Achieve reductions in the B.O.D levels - Work with catering to reduce the volume of soups/gravy/porridge/milk that is disposed to drain. Work with clinical staff to eliminate inappropriate disposal of material into macerators.	Catering Maintenance Department Edward Murphy	In Progress
7.	**Litter Management**	Monitor litter generated on the campus and	Edward Murphy	In progress

		develop litter audit tool.	Maintenance Dept.	
		Review conditions of existing external bins and identify locations for additional external waste bins to minimise littering on the campus.	Edward Murphy Maintenance Dept	Complete 2015
8.	**Paper usage**	Review paper usage throughout the hospital and quantify the total spend annually on paper and ink – potential cost saving to be quantified.	Edward Murphy Stationary	In Progress
		Digital Clinical Information System in CUMH to reduce printing and generation of paper files.	ICT	In Progress
		Old ECG machines to be replaced to eliminate printing of paper ECGS. ECGs will be digitally archived.	Biomedical Engineering	In Progress
		Review new electronic fax system that is currently in use in CRC – fax is sent to an email account rather than being printed.	ICT Edward Murphy	Complete
		Promote the use of re-usable envelopes for internal mail.	Edward Murphy Stationary	Complete
		Ensure all printers are set to double side printing as default setting.	Edward Murphy ICT	Complete
		Information campaign to promote using more digital documents and printing only required pages to be undertaken.	Edward Murphy	Complete
		Awareness drives to promote reducing paper and printer ink/toner usage.	Edward Murphy ICT	Complete
9.	**Awareness Campaign**	Update sustainability notice boards regularly with themed information and info graphics .	Edward Murphy	On-Going

		Set out schedule of awareness themed awareness days for 2015; Energy, Water and Waste. Send global email messages as required to alert staff to events etc.	Edward Murphy Waste Management Eric Crowe	On-going
		Further develop the CUH Green pages in collaboration with ICT.	Edward Murphy ICT	In Progress
		Develop and publish monthly Environmental Campaign staff newsletters.	Edward Murphy	On-Going
		Host Green Healthcare Training event in partnership with the EPA in CUH staff canteen.	Waste Management	Complete
10.	**Water management**	Incorporate water management into the awareness campaign. Water Conservation and Protection should be the next major theme of the programme in CUH for assessment in 2017	Edward Murphy Eric Crowe	In Progress
		Compile water billing information; establish baseline water consumption, waste uses, sources etc.	Maintenance Dept. Eric Crowe Edward Murphy Clean Technology Centre	Complete
		Conduct water leak survey on the campus to ascertain if leaks exist.	Eric Crowe Maintenance Department	Complete
		Install additional sub-metering on mains water.	Eric Crowe Maintenance Department	In progress
11.	**Partnership with UCC and CIT**	Develop partnership with UCC and CIT in order to share learning and ideas. CUH Sustainable Environment Officer to become a member of UCC Green Campus Committee. CUH messages and achievements to be made available on UCC Green Campus Facebook page. Work with	Edward Murphy	Complete

		UCC to establish best means for the Dental Hospital to participate in the Green Campus going forward.		
12.	**CUH Paediatric School**	Apply to An Taisce for CUH Paediatric School to become a Green School in its own right.	Edward Murphy Gobnait Curran	No sure??
13.	**BioBlitz2015**	Liaise with UCC Green Campus Committee in order to bring the BioBlitz to CUH campus in September.	Edward Murphy UCC Green Campus Committee	Not Progressed
14.	**Staff Engagement**	Continue to recruit Green Advocates and deliver GA training module to interested staff. Training module to be delivered bi-annually. Update ward/department notice boards with details of local Green Advocates.	Edward Murphy Eric Crowe	Complete
		Continue to populate waste and energy register of opportunities with suggestions from Green Advocates and other staff.	Edward Murphy	On going
15.	**Audit and Survey**	Continue weekly management walkabout survey to examine waste and energy systems at clinical level.	Tuesday Walkabout Team	On going
		Hold unannounced day and night-time energy surveys.	Edward Murphy Eric Crowe	Complete and to be repeated
16.	**Biodiversity and Restorative Spaces**	Establish staff led garden groups in order to continue to develop the gardens and courtyards around the campus. Updates and developments to be made available to all staff via the CUH Green Pages and newsletter.	John McDermott Edward Murphy	In Progress
		Reuse material and plants in the paediatric	Maintenance	In Progress

		garden to further develop and landscape other green spaces within the campus during the development of the new Children's Department.	Department	
17.	**Student Engagement**	Work towards incorporating a module on sustainable healthcare for students who are on placement on campus.	Edward Murphy Centre of Nurse/Midwifery Education	In Progress
		Undertake a student led project with infection control around the five moments for hand hygiene. Provide education around how hand hygiene can reduce the length of time a patient stays in hospital due to hospital acquired infections and how it can they can be prevented.	Edward Murphy Infection Control Centre of Nurse Education	Complete
		Work with CUH Arts Coordinator and City Council to finalise a design for new CUH bus shelter and move project forward.	Edward Murphy Edelle Nolan HSE Estates	In Progress
19.	**Travel**	Install real time bus information screens in an agreed location on CUH campus.	Edward Murphy National Transport Authority	Complete
		Extend the UCC bike scheme to CUH.	Edward Murphy UCC Travel Manager	In Progress
		Work with Cork City Council to bring the Coca-Cola bikes to the CUH Campus.	Edward Murphy	In Progress
		Explore ways in which CUH can enhance itself as a smarter travel workplace – car sharing initiatives, sharing of information around public transport.	Sustainability Steering Group National Transport	In Progress

		Establish and implement a working mobility management plan for CUH campus.	Sustainability Steering Group Mobility Management Committee	In Progress
20.	**Monitoring and Reporting**	Compile all sustainability related billing information, graph and trend data and report to the Sustainable Environment Steering Group on a regular basis.	Edward Murphy Eric Crowe	On going
		Extend sub-metering programme in order to improve accuracy on energy reporting.	Eric Crowe HSE Estates Maintenance Department	On going
21.	**Sharing Experience and Knowledge with the Wider Community**	Share knowledge and expertise that that has been gained in CUH with the wider HSE community, NHSO, An Taisce and other organisations that are interested in environmental initiatives.	Sustainability Steering Group	On going
		In partnership with NHSO/HSE Estates, host an Environmental Symposium in CUH in September 2015.	Sustainability Steering Group HSE Estates	Complete

4.4 Action plan 2016

No.	Element	Action	Status
1.	**An Taisce/Green Flag**	Develop and submit documentation for renewal of the Green Flag in July 2016.	Complete
		Further develop the themes within the Green Campus programme which will be formally reassessed at CUH in 2017. As well as energy and waste, CUH should also actively include water, travel, chemicals in the environment and food as themes in its 2017 submission.	On going
2.	**Energy Infrastructure**	Apply to Estates for separate funding for smaller scale energy initiatives in CUH and develop a technical project proposal for CUH campus for 2016. This should include Energy Mapping the hospital site to inform future decision making around energy projects. The following projects have been identified for 2016; Booster Sets Boiler Optimisation Chiller Optimisation Water Metering Water Saving Devices for Shower Heads AHU Fans Replacement DB Meter Survey Energy Survey Burner Upgrade Works (€500,000 project)	Projects currently being tendered
		High investment opportunities and European funding to be explored with HSE Estates and SEAI. Business cases to be developed for applications for projects including CHP for CUH and re-lamping project.	Completed. Under assessment
		Survey for further roll out of utility metering across the campus to include water, gas and electricity. CUH has engaged with the Office of Public Works around a hospital wide metering project to begin in early 2016.	In progress
3.	**Clinical Waste Management**	Explore new system of sharps waste management with SRCL – identify whether system would be cost-effective.	To be included as part of new HCRW contract Q3 2016

		Reduce healthcare risk waste tonnage to levels that meet EPA waste benchmark of 1.9kg/in-patient bed day through staff education and awareness.	On going
		Achieve a reduction in HCRW waste tonnage to 45 tonnes/month by 2017.	On-going. Current monthly average is 48.5 tonnes.
		Carry out audits of clinical areas to ensure compliance with bin location guidance and healthcare waste segregation.	On going
		Following analysis of audits carried out, target risk waste specific awareness campaigns in areas where compliance with waste segregation is poor.	In Progress
		Hold bi-monthly waste management meetings to discuss costs and trends and address any problems that may arise.	On going
4.	**Hazardous Wastes and Chemicals in the Environment**	Procure the services of a Dangerous Goods Safety Advisor to review chemical storage, use and disposal.	Complete
		Establish a database of chemicals in use on the hospital campus. Source and make Material Safety Data Sheets available to all line managers.	Complete
		Review medicines disposal with pharmacy department. Guidelines around pharmaceutical disposal currently being drafted.	Under review, awaiting national policy.
5.	**Recycling**	Continue to increase recycling by appropriate segregation through staff training and increasing awareness.	On going
		Medium term goal – to increase recycling by a further 25-30 tonnes by 2017.	Ongoing – Issues with current waste contractor remain unresolved. Contract to be retendered in Q4.
		Establish a live data base on the CUH website for the exchange of furniture and other items that may have been routinely disposed of in the past.	Furniture now being redistributed within CUH.
		Undertake project to recycle X-rays that qualify for disposal that are currently in storage in Iron Mountain. Silver and plastic content to be extracted and recycled.	Selection process complete. Project to begin in Q1 2017.
		Reuse of materials in the old GF unit. Building materials to be recycled and reused in the new Radiation Oncology development.	Completed
6.	**Food and Food**	Work with catering to reduce the amount of plate waste that is returned from	On going

	Waste	the wards to the kitchen. Review of meal times, menus and portion sizes required.	
		Undertake project around review of milk waste and milk formula waste in CUMH.	Began November 2014. Project complete
		Achieve reductions in the B.O.D levels - Work with catering to reduce the volume of soups/gravy/porridge/milk that is disposed to drain. Work with clinical staff to eliminate inappropriate disposal of material into macerators.	In Progress
		Explore the Possibility of growing food for consumption in the Staff Canteen.	Complete – Project currently running
8.	**Awareness Campaign**	Update sustainability notice boards regularly with themed information and infographics .	On going
		Set out schedule of awareness themed awareness days for 2015; Energy, Water and Waste. Send global email messages as required to alert staff to events etc.	On going
		Further develop the CUH Green pages in collaboration with ICT.	On going
		Develop and publish monthly Environmental Campaign staff newsletters.	On going
		Host Green Healthcare Training event in partnership with the EPA in CUH staff canteen.	Complete
		Liaise with the Office of Public Works to provide Optimising Power at Work awareness for the CUH campus	Complete campaign in progress
9.	**Water Management**	Incorporate water management into the awareness campaign. Water Conservation and Protection should be the next major theme of the programme in CUH for assessment in 2017	Complete
		Compile water billing information; establish baseline water consumption, waste uses, sources etc.	Complete
		Conduct water leak survey on the campus to ascertain if leaks exist.	Complete
		Install additional sub-metering on mains water.	Currently being tendered
		Participate in European Water Stewardship programme. CUH will be the first European hospital to do so.	Initial meeting held. Project to begin in Q1 2017
10.	**BioBlitz2016**	Liaise with UCC Green Campus Committee in order to bring the Bio Blitz to CUH	Due September 2016,

		campus in September.	overdue
11.	**Staff Engagement**	Continue to recruit Green Advocates and deliver GA training module to interested staff. Training module to be delivered bi-annually. Update ward/department notice boards with details of local Green Advocates.	Training dates organised for 2016. Training taking place in March, June and October
		Continue to populate waste and energy register of opportunities with suggestions from Green Advocates and other staff.	On going
12.	**Audit and Survey**	Continue weekly management walkabout survey to examine waste and energy systems at clinical level.	On going
		Hold unannounced day and night-time energy surveys.	Night surveys planned 2018
13.	**Biodiversity and Restorative Spaces**	Establish staff led garden groups in order to continue to develop the gardens and courtyards around the campus. Updates and developments to be made available to all staff via the CUH Green Pages and newsletter.	On going
14.	**Student Engagement**	Work towards incorporating a module on sustainable healthcare for students who are on placement on campus.	February 2017 – Access granted to UCC nursing and midwifery induction. On going
		Undertake a student led project with infection control around the five moments for hand hygiene. Provide education around how hand hygiene can reduce the length of time a patient stays in hospital due to hospital acquired infections and how it can they can be prevented.	Complete
15.	**Travel**	Work with Cork City Council to bring the Coca-Cola bikes to the CUH Campus.	Proposal made to the NTA at event in March. On going
		Explore ways in which CUH can enhance itself as a smarter travel workplace – car sharing initiatives, sharing of information around public transport.	In Progress
		Develop and implement a working mobility management plan for CUH campus.	In Progress. Annual travel surveys and reporting to Cork City Council now routine.

		CUH to join the Cork City Transport and Mobility Forum and feed into transport initiatives in Cork.	Complete
16.	**Monitoring and Reporting**	Compile all sustainability related billing information, graph and trend data and report to the Sustainable Environment Steering Group on a regular basis.	On going
		Extend sub-metering programme in order to improve accuracy on energy reporting.	To be carried out with the OPW Q1 2017. On going
		Paperless electronic patient notes system to be introduced in CUH maternity services .	Complete 2017
17.	**Sharing Experience and Knowledge with the Wider Community**	Share knowledge and expertise that that has been gained in CUH with the wider HSE community, NHSO, An Taisce and other organisations that are interested in environmental initiatives.	On going
		In partnership with NHSO/HSE Estates, host an Environmental Symposium in CUH in September 2016.	November 2016
		CUH to publish a booklet around the steps taken towards achieving a more sustainable model of healthcare and living to form part of a suite of documents as part of its overall Change Programme.	Complete
18.	**Mandatory Staff Training**	Continue to provide risk waste and medical recycling training as part of the hospital's PCHCAI Programme and provide local sessions for areas where compliance is poor where needed.	On going

5 Monitoring and Evaluation

5.1 Process/Practices

The monitoring of the maintenance themes energy and waste and the new themes water, transport and biodiversity is undertaken by managers with responsibility for the areas under their remit. The data concerning each of these areas is emailed to all line managers regularly as part of awareness campaigns. The data is also communicated at the sustainable healthcare steering group meetings in order to evaluate analyse and compare data against agreed / established targets. When indicated findings are added or changed, this is amended on the action plans.. Action plans are formulated annually. Successes are celebrated through various organization communication channels.

The detail of such monitoring is as follows

- HSE Estates South in collaboration with the CUH Maintenance Department tracks all information relating to Energy & Water. Bills are evaluated and compared to track water and energy trends.
- The Waste Office / Sustainable Environment Officer tracks all information relating to Waste,
- The Business Finance Manager and Sustainable Environment Officer track all information relating to Transport. Transport is monitored through mobility management plans on a yearly basis.
- The Sustainable Environment Officer coordinates and tracks all information / linkages relating to the sustainability programme and awareness campaign
- All Information on waste is available on a shared folder. All information on energy is shared with champions through email circulation.
- Biodiversity is monitored through garden group communication via email and liaison with maintenance department and external landscape contractors.

5.2 Objectives Evaluation & Benchmarking

The CUH campus energy, waste and water dashboard sets out the baseline data (2014) used for each of the Sustainability Indicators and identifies the changes in patterns of consumption for each. Each year the changes are identified against performance measured for 2014 versus 2017. A Traffic Light colour coding system is used to provide an easily recognisable indicator to performance; i.e. positive or negative.

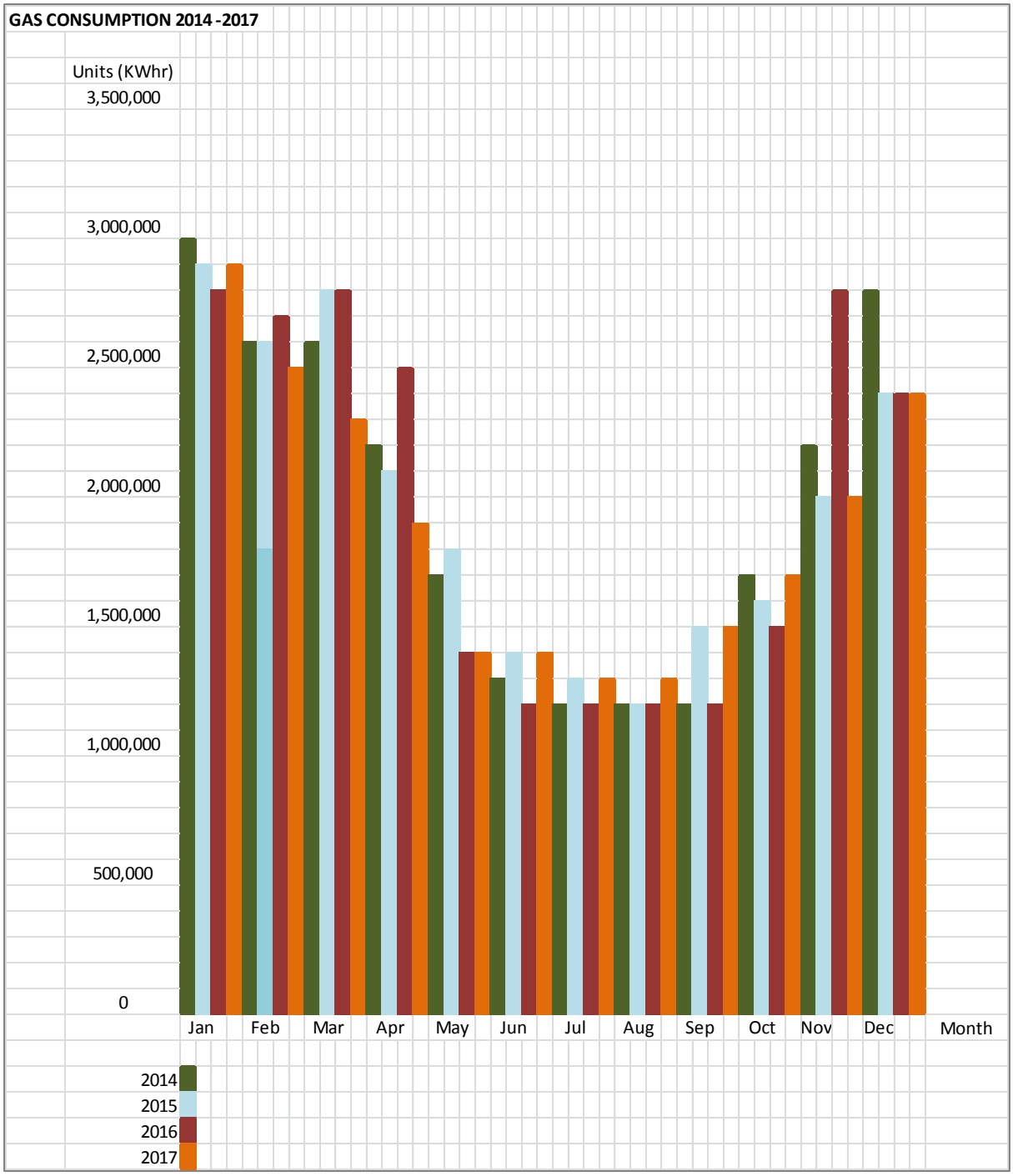
Key Performance Indicators (KPIs) are under review, but for the initial Dashboard the KPIs used relate to the unit value for the Indicator and the Patient Contact figures. The Patient Contact figures highlight activity within the campus, which is directly related to energy. The water consumption and waste generation is based on in patient bed days.

Figure 4-1 CUH KPI Dashboard

Theme	Indicator	Baseline	Baseline Year	How are we doing overall 2017				Per Patient Contact 2017		
				Total	Unit	Change	2020 Target	Total	Unit	Change
Energy & Carbon Management	Total Energy (Actual)	41,106,196	2014	39,886,663	kWhr	-3%	-33%	25	kWhr/patient contact	-19%
Water	Total Water Use	168,081	2014	196,665	m3	15%	<530	674	m3/ patient bed day	27%
Waste	Mixed Recyclables	293	2014	109	t	-169%	0.90	0.37	kg/ patient bed days	-59%
	Health Care Risk	593	2014	610	t	3%	1.90	2.09	kg/ patient bed days	10%
	Food	74.43	2014	71.42	t	-4%	0.70	0.24	kg/ patient bed days	-65%
	General Waste	652.89	2014	974.00	t	33%	4.20	3.34	kg/ patient bed days	-21%
	Total	1,613	2014	1,764	t	9%	7.70	7.09	kg/ patient bed days	-8%

Figure 4-2 Patient contact figures

2014	2017
660,650 Patient Contacts	627,698 Patient Contacts


GAS CONSUMPTION 2014 -2017
Units (KWhr)
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
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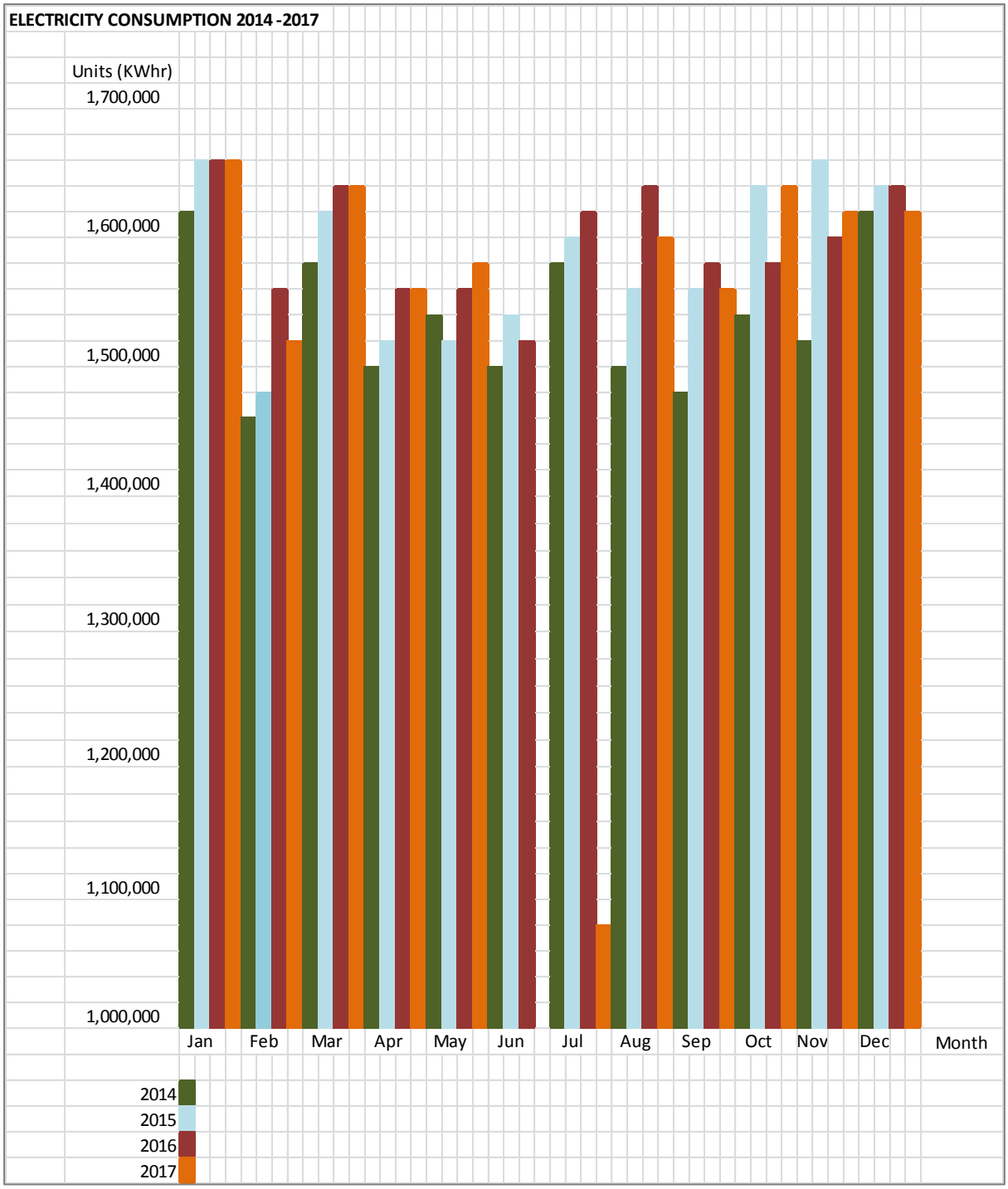
2015
2016
2017



5.3 Energy and Gas consumption

The above graphs show both energy and gas consumption comparing 2014 to 2017. The electricity has increased over the last three years due to patient activity and new building onsite. The gas has decreased over the last number of years. The decrease in 2017 is due to new more efficient burners fitted to the boiler rooms.

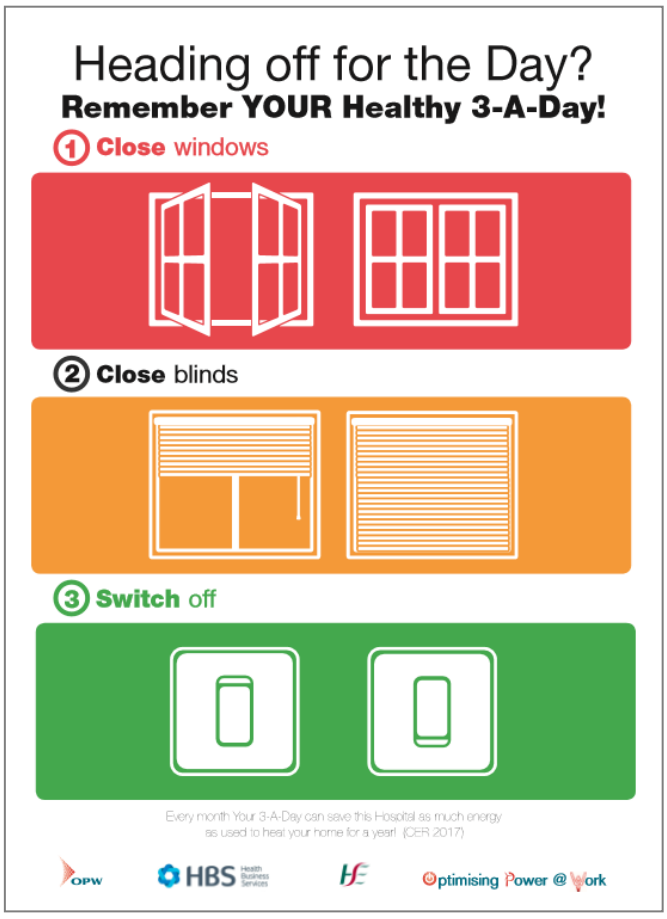
Energy initiatives

The Optimising power @work campaign started in November 2017 on CUH campus. The programme focuses on behavioural changes at local level. The focus for December and January is heating. The energy champions under took a task of taking temperatures readings in 50 different departments at 10am and 4pm over a four week period. The OPW consultants have taken this data to analyse it and formulate a heat map.

Changing behaviour

The focus for December is to remind staff to close windows, blinds and switch off computers and lights. December is a month where energy can be saved in admin offices where employees are on holidays over the Christmas period.

Figure 4-3 current awareness poster from Office of Public Works



Energy awareness day 7th November 2017

The first Optimising power @ work initiative encouraged employees on campus to look at the different energy saving ideas available to use at home. If staff take responsibility at home for saving energy they are more likely to also implement this in work. The awareness day was a great success and it is planned to run another day in 2018.

Figure 4-4 Shows energy awareness day 2017 in staff canteen

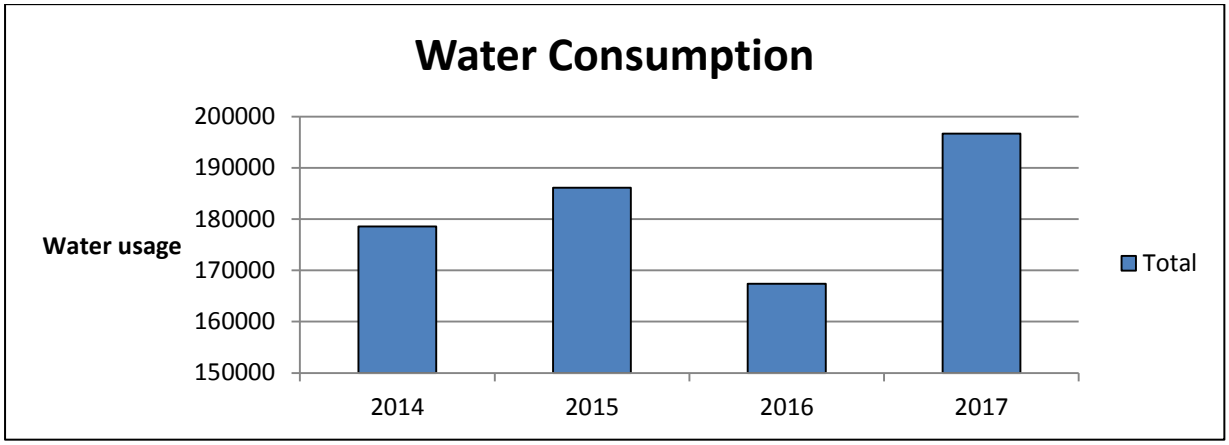
Energy Conclusion

CUH campus energy has reduced by 3% in the last three years however due to the new buildings onsite this will increase again by next year. The main aim is to change behaviour onsite and drive the optimising power@ work initiative. When the sub meters are fitted on campus the software will allow a more in depth monitoring and evaluation of the energy usage.

5.4 Water monitoring and evaluation

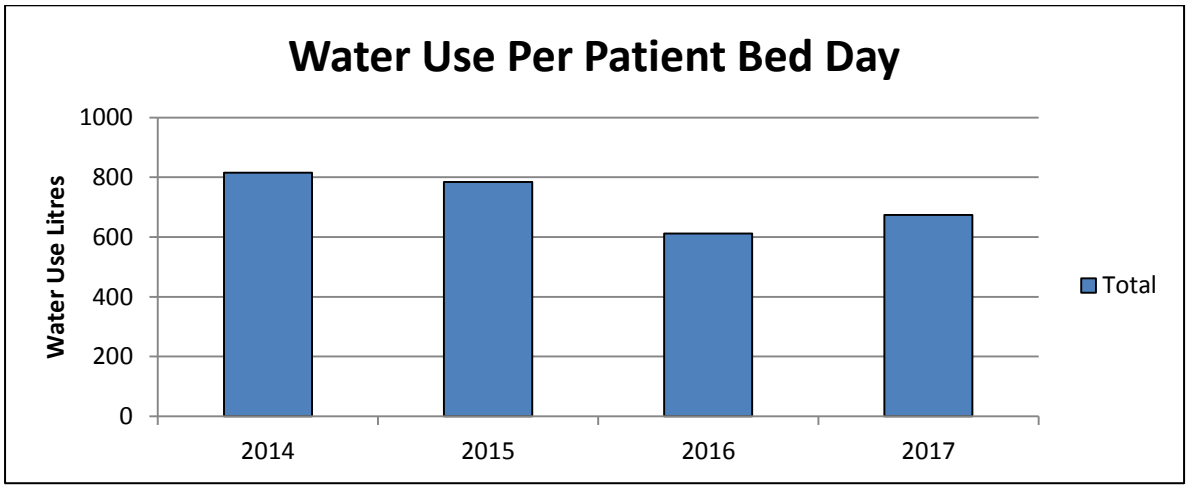
Water consumption currently stands at 170,500m3 on average per year. The water use is monitored online and through billing. The maintenance department processes and controls all water billing; if an increase in consumption is detected water use is then checked on meter.ie to clarify exactly when the issue has occurred. If there is a major leak occurring CUH will be notified by the council who monitors the meter.ie readings. There is also a contractor onsite who looks after leak detection, step tests etc.

Figure 4-5 shows water consumption from 2014-2017



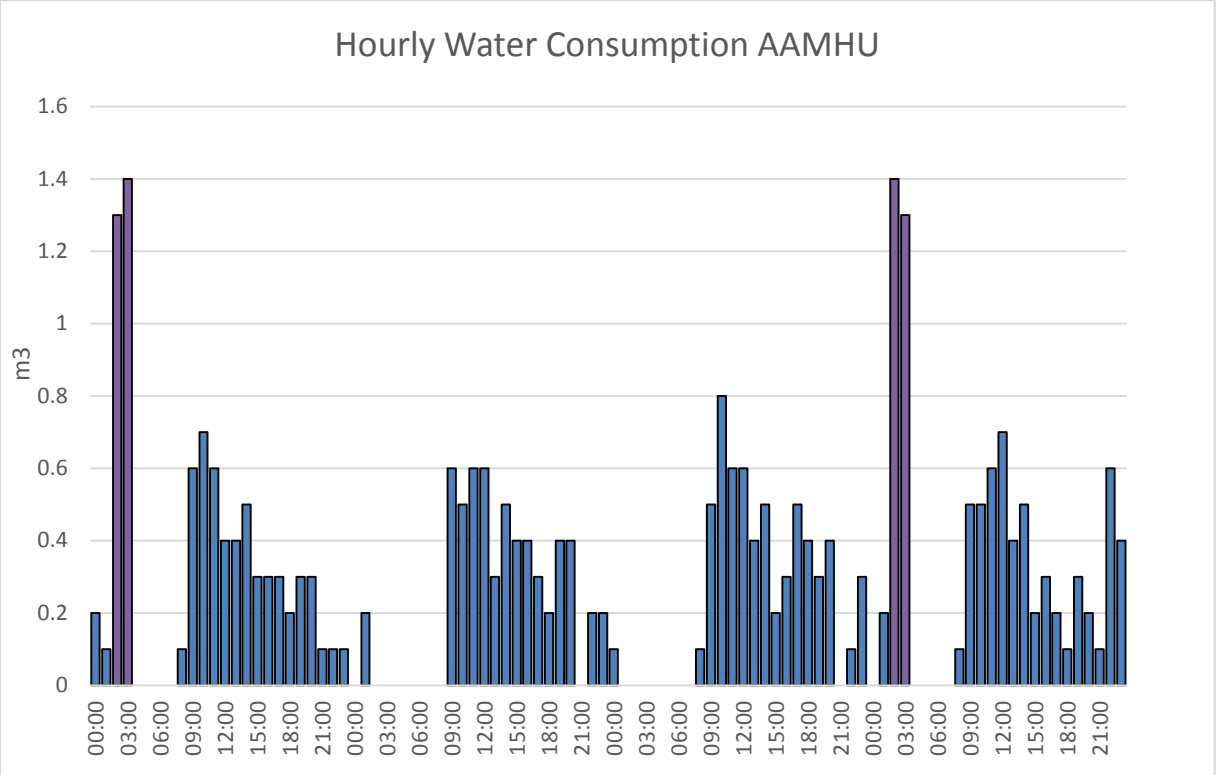
Using quarterly bills we can map water coming into the campus. The above graphs show the consumption from January 2014-June 2017.CUH campus activity has increased with bed days and onsite building. Also there was a leak detected in December 2017 which increased consumption.

Figure 4-6 show water per in patient bed day



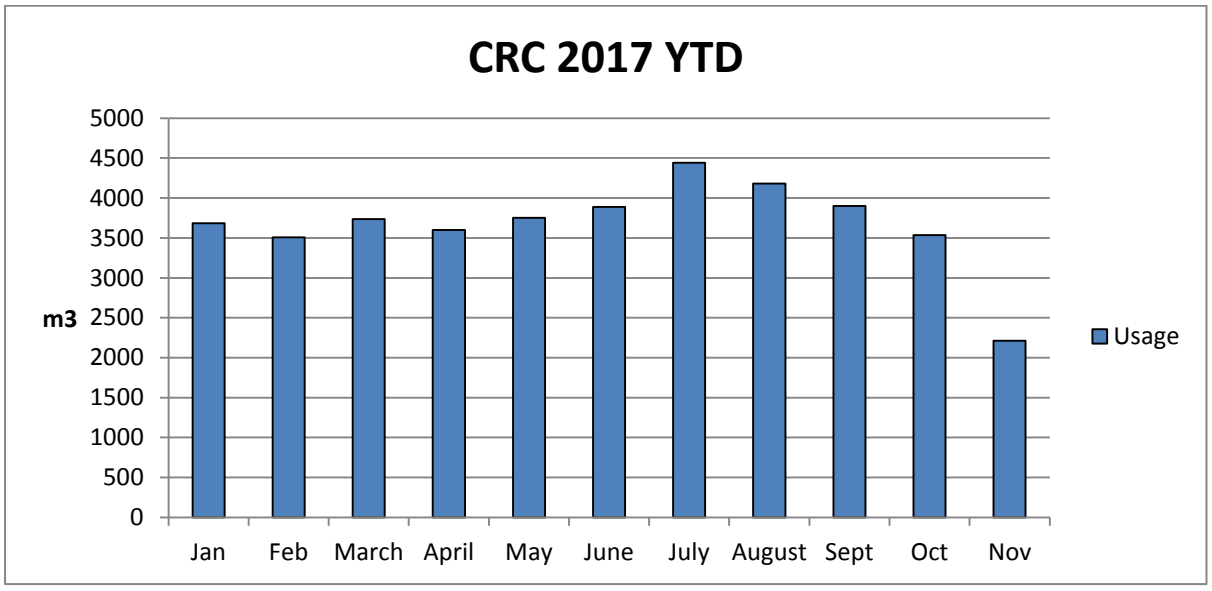
CUH worked with the EPA Green Healthcare Programme, which is co-funded by NHSO(National Health Sustainability Office), to collect data on water usage. The graph above demonstrates the water used per in patient bed day from 2014-2017. A decrease in water usage is evident from 2015 to 2016, this is due to leak detection in 2015 bringing the water use per in patient bed day down to 611 litres in 2016. This has increased to 674 in 2017 as consumption has increased. The overall target for 2020 is <530 litres per in-patient bed day.

Figure 4-7 Water consumption by AAMHU over a 4-day period.



The AAMHU(Adult Acute Mental Health Unit) has a BMS system which has software to measure via the water sub-meter the exact amount of water consumed in this building. The water usage in the AAMHU is zero for much of the night. This is an excellent sign that there is no leakage or unnecessary background water consumption.

Figure 4-8 shows water consumption in Cardiac Renal Centre from Jan 2017 - Nov 2017



The CRC (Cardiac Renal Centre) building is a significant user of water due to the RO system in dialysis. RO systems typically reject 50-70% of the incoming water as part of their normal process in preparing ultra-pure water for dialysis. The installation of a data logger on this water meter is recommended as it would allow more detailed data to be gathered and provide a better understanding of the consumption trends.

Figure 4-9 Water Usage Guidelines (Litres per Patient Bed Day). Courtesy of Thames Water UK.

Litres per patient bed day	Acute Hospital >100	CUH
Good	<530	
Average	530-700	674
Poor	700-1137	

The Sustainable Healthcare Building Guidelines from HSE provided the above benchmark for water in hospitals. Healthcare facilities have to balance water conservation with maintaining infection control standards. The HSE spends over €8m per annum on water supply. 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.

Clean Technology Water Study

A detailed water study was carried out in Cork University Hospital in May/June 2016 as part of the Green Healthcare programme.

The aims of the study were as follows:

- To collect baseline water consumption data for key areas of the hospital using existing sub-meters
- To carry out a targeted assessment of water fixtures examining appliance type, flow rate and hot water temperature and compare these with best practice values
- Based on the above, identify key areas for water conservation and improved sub-metering
- Current Green Healthcare benchmark flow rates.

Recommendations for existing sub meters from water study.

The water study made the following observations and recommendations in relation to water sub-meters.

The current set-up of water meters in CUH is impractical for on-going regular reading at such a large and spread out site. Outdoor meters are difficult to find and often are quite inaccessible. They are installed in a variety of man-hole types requiring a range of keys. Several of these man-holes are physically very difficult to open and close.

The indoor meters are located in areas with a range of access requirements. Different keys were needed for different meters and not all keys were available e.g. doctors' residence. Other meters were difficult to read due to their position (near ceilings, up-side down) or condition (foggy, water logged, dirty etc.).

The size of the CUH campus also makes manually reading meters quite time consuming. For this study, the most direct route around the campus to read the seven meters was over 1 km and took approximately half an hour to complete. This manual method of water monitoring is fine for a one off water study, but overly time consuming as an on-going monitoring method for large sites with as many meters as CUH.

In order to efficiently and accurately monitor hospital water use, CUH should assess the positioning/lay-out of the water distribution network and invest in a new system of strategically placed, online water meters.

Online systems, like those installed on the mains water supply and in the new AMHU, provide instantly accessible data that is presented in a much more useful way. Replicating this system (AMHU) throughout the hospital would require a number of meters to be repaired/replaced and the strategic installation of additional meters.

All meters should then be linked to one individual IT system which could compare the mains volume supplied with water used on site in different areas. This would allow major consuming areas to be identified and tracked. It would also provide information on a number of the issues identified from the online system recording the mains supply, namely the high background water use ($10m^3$/hour) and the strange peaks that occur during the nights.

The following Table provides a summary of the meters assessed during this study with recommendations where appropriate.

Figure 4-10 overview of meters and recommendations.

Meter no.	Area	Meter	Key Recommendations
1	Mains	Online – meter.ie	Follow up on high night time use and overnight peaks
2	CRC	Functional, manual	Install data logger and link to online system
4	CUMH	Functional, manual	Install data logger and link to online system
5	Main Ward Block	Faulty	Replace with new meter and link to online system
7	Private Clinic	Manhole cover v. difficult to remove	Install data logger and link to online system
8	Nurses Residence	Faulty	Replace with new meter and link to online system
9	Doctors' Residence	No access for study	Install data logger and link to online system
10	UCC Dental Hospital	Functional but difficult to read – near ceiling, water in dial	Install data logger and link to online system
13	GF Ward	Enclosed space and condensation on dial	N/a building due to be demolished
14	ED	Enclosed space and faulty	Replace with new meter and link to online system
18	AMHU	Online – BMS	Use as good practice internal example
19 & 20	City Mortuary	2 adjacent meters	Consolidate two meters and install data logger and link to online system
21	Maintenance Heating	Functional, manual	Install data logger and link to online system. Investigate high consumption.

Water Fixtures

As shown in the environmental review the study evaluated and monitored water usage using existing manual water meters and surveying flow rates in sinks taps. Toilet cistern size and tap and shower flow rates have been compared to best practice values as recommended by Green Healthcare.

Figure 4-11 Current Green Healthcare benchmark flow rates

	Flow rate (l/min)			
	Hand Wash Sinks	**Utility Sinks**	**Showers**	**CUH main block showers**
Good Practice	≤ 5	≤ 8	≤ 8	<7
Acceptable	6 - 10	8 - 12	8 - 12	
Poor	11 - 15	13 - 18	12 - 18	
Very poor	> 15	> 18	> 18	

Evaluation and recommendations for water fixtures

The table above shows the benchmarks for flow rates for various fixtures. The water fixtures of Cork University Hospital typically have flow rates above recommended levels. In general, in older areas of the hospital e.g. the main ward block, OPD, recorded flow rates were consistently high. However, newer areas e.g. CUMH and CRC also commonly have excessive flows, especially in utility sinks. Flow rates for water fixtures that far exceed recommended levels should be reduced. Reducing flow rates in the taps identified will reduce the water costs significantly.

Reducing the flows of some of the worst performing taps could have significant financial benefits though reduction in water costs. CUH is a large campus and as the data shown in the environmental review there are a variety of water fixtures on site which make monitoring the flow rates more difficult. Green Healthcare have suggested an individual coding/labelling system for water outlets that would make the management of water simpler.

Shower project CUH

In 2017 120 shower heads were replaced in CUH campus. The showers currently have flow rates of 22 litres throughout the hospital. The figures below show the cost savings of the project with projected future savings with all 429 showers changed on site. It is planned for all showers to be changed over the next 2 years.

Figure 4-12 CUH shower project

	Original showers (2016)	**Medishower (2017)**
Flow rate	25 l/m	**7 l/m**
Average Shower Duration	8 min	8 min
Annual usage(1 shower	365	365

per day)		
Total water usage per shower per PA	73,000 litres p/a	20,440 litres P/A
Cost per Cubic Meter	€2.50/1000 litres	€2.50/1000 litres
Cost per Annum per shower	€182.50 P/A	€51.10 P/A
Total showers	120	120
Total Running Costs	€21,900	
Total Savings for 120 showers	15,768.00 P/A	
Total savings for 429 showers on site	€56,3700.00 P/A Approx.	

HSSD Autoclave water savings

In 2017 HSSD have acquired 8 new autoclave machines in the HSSD department. This was done on a phased basis. The table below shows figures for 4 autoclaves and gives the yearly average cycle per annum. The water cost saving is projected at €10,000 savings per year.

Figure 4-13 HSSD water savings

Old autoclave Water Usage	New Autoclave Water Usage	Cycles per year	Water saving per cycle	Total water savings P/A	Cost savings
850litres per wash cycle	269 litres per wash cycle	7452	581 litres	4329612 litres	€10,000 P/A

The above projects combined already save an estimated 10,600 m3 of water each year, representing 6% of site water use. Once the showerhead replacement project is completed, the combined savings for the showerheads and 4 autoclaves will be an estimated 22,500 m3 a year. This corresponds to 13% of site water use, and is equivalent to the amount of water used by 245 Irish households each year.

Monitoring and Evaluation Leak Detection

CUH currently have a low-flow on site carrying out leak detection testing and planning to continue this project into 2018. An updated monitoring system is needed in CUH to closely monitor and evaluate water.

CRC Courtyard: The potential leak noise in the CRC Courtyard in 2017 was investigated in 2017 and no leaks were detected.

Tank Drop-Test: This test was completed in 2017 and the test was positive as there were leaks detected.

Site Step-Test: Finally, the contractor has recommended that the site should be subjected to a full and through Step-Test program, due to the excessive MNF (minimum night flow) of 2.63 Litres per second which corresponds to a cost of = >€204,339 per annum. This test was due to be carried out at the end of December 2017.

This step test will involve planning and isolation of complete sections of the external pipe work in order to understand what areas are seeing high demand.

This will highlight any areas which may have leaks that are not acoustically detectable.

Sections are to be isolated for a period of 30 minutes so that the test will be captured on the online input water meter to the site.

It has been recommended that this work is carried out at low usage times possibly from 7pm to 6am.

Water Protection

Cork University Hospital was granted license to discharge waste water to sewer in 1985. Currently the license is under review by the Cork City Council.

Waste Water Monitoring

Waste water monitoring takes place regularly with fats oils and grease (FOG) and biological and oxygen demand (BOD) measured throughout the year. The tables below show the original readings from 2013 and compare to 2015/ 2016. The results are variable, but in general are increasing. The differences here are the increase in patients on site and this affects the waste water results. There are no waste water readings available for 2017 as the council have yet to send results to CUH.

Figure 4-14 Waste Water Monitoring Results 2013

Date	BOD	FOG
Jan 2013	475	68.4
Apr 2013	450	64.8
Aug 2013	334	49.4

Figure 4-15 Waste Water Monitoring Results 2015 and 2016

Date	BOD	FOG
Feb 2015	681	54
Apr 2015	516	87
Sep 2015	358	22
Dec 2015	601	65
Feb 2016	803	112
May 2016	358	15

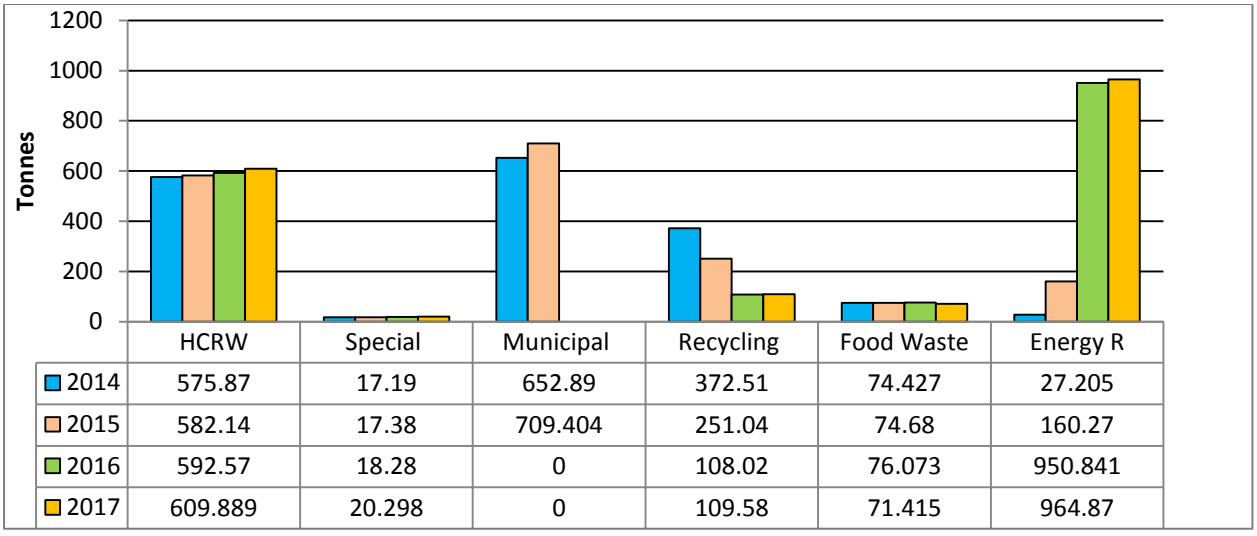
Water Conclusion

Water is a basic need and is one of the most wasted resources we have. The management of water needs a huge amount of capital to improve. However with leak detection tests on going on site it will help eliminate water lost due to leaks. Investment in metering software will improve the monitoring of water throughout the campus. Making employees aware of water consumption and costs will help change the mindset when using water in everyday work. A hospital campus has to have measures in place to flush water to prevent infections such as legionella. However fixtures and fitting can be change to reduce flows while also providing a more than acceptable hand washing experience for infection control purposes.

5.5 Waste Monitoring and Evaluation

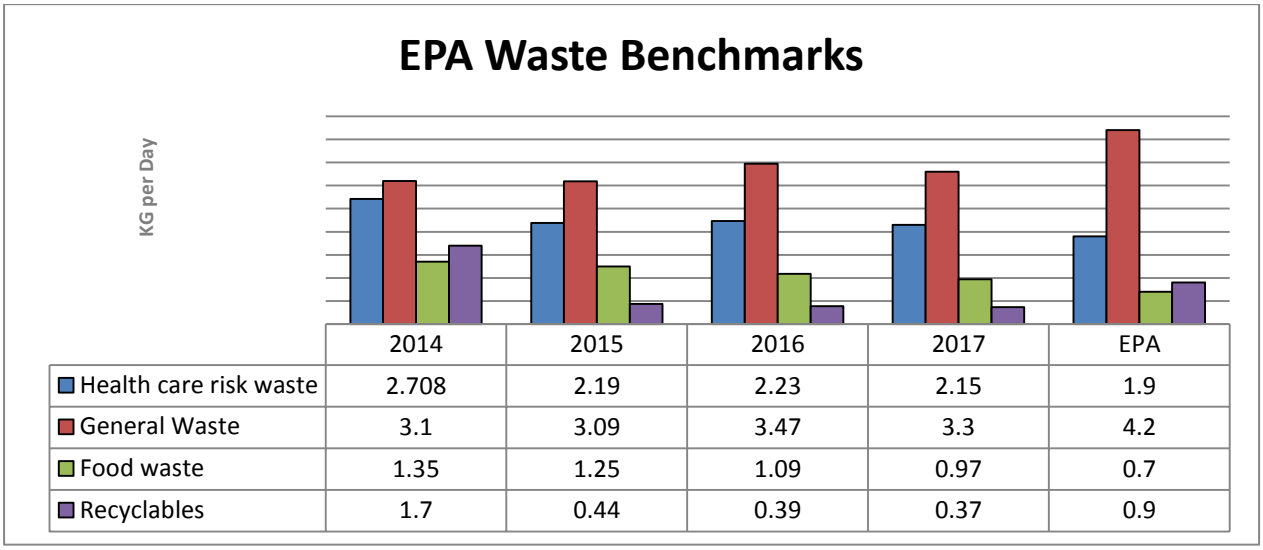
The CUH campus waste stream is complex. In patient bed days and outpatient clinics have increased driving the waste amounts to increase in certain areas. The lack of recycling due to contamination issues has led to the increase in energy recovery waste and a reduction in recycling. In 2017 the waste office provided awareness sessions on energy recovery to areas like Theatre and ED to reduce the amount of residual waste ending up in the Healthcare Risk waste streams.

Figure 4-16 shows the annual tonnage 2014 to 2017



	HCRW	Special	Municipal	Recycling	Food Waste	Energy R
2014	575.87	17.19	652.89	372.51	74.427	27.205
2015	582.14	17.38	709.404	251.04	74.68	160.27
2016	592.57	18.28	0	108.02	76.073	950.841
2017	609.889	20.298	0	109.58	71.415	964.87

Figure 4-17 shows CUH Waste Benchmark 2014-2017 versus EPA Benchmark



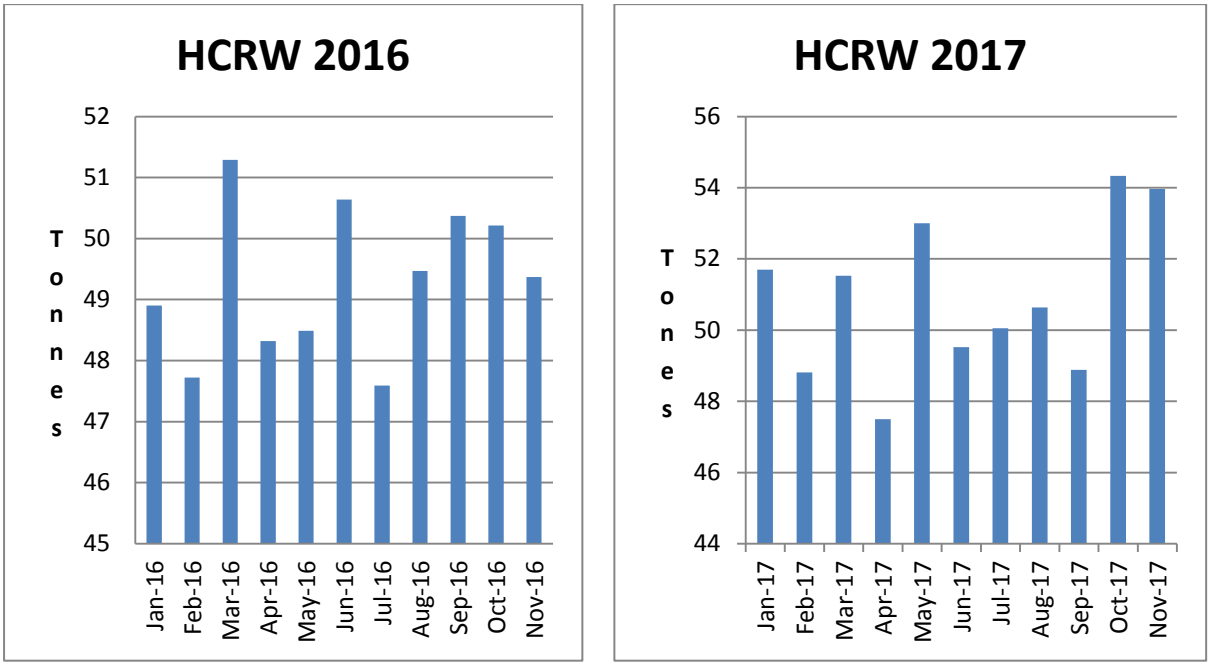
	2014	2015	2016	2017	EPA
Health care risk waste	2.708	2.19	2.23	2.15	1.9
General Waste	3.1	3.09	3.47	3.3	4.2
Food waste	1.35	1.25	1.09	0.97	0.7
Recyclables	1.7	0.44	0.39	0.37	0.9

The comparison in Figure 4-20 above shows that all waste streams have increased. This graph is based on inpatient bed day figures. There is a huge volume of other patient contact that is compared in the dashboard above at the beginning of the chapter. The guidelines set from the EPA are achievable only by implementing changing behaviour of staff and creating awareness of correct waste segregation. The HCRW (Healthcare risk Waste) stream has seen the biggest increase. This is due to increase in patient numbers but poor segregation accounts for 6-8% overall. SRCL(Risk waste contractor) has provided risk waste training in autumn 2017 to the top 10 producers of waste on campus. As a result the waste has reduced slightly but over the 12 month period it is excessive. More awareness training and increased auditing is needed to reduce the HCRW on campus.

Evaluation of the Healthcare Risk Waste

As Figure 4-19 below compares the last two years of HCRW and there are significant peaks during winter months which are due to increased patient capacity. There has been a reduction in the number clinical waste bins on site; however this year it has risen significantly in the last two months, there is a bin location guide attached in appendices 10.4 a clinical yellow bin is only allowed in Dirty Sluice rooms and Isolation rooms only. Residual waste often ends up in this stream and more awareness training is need around the segregation of waste.

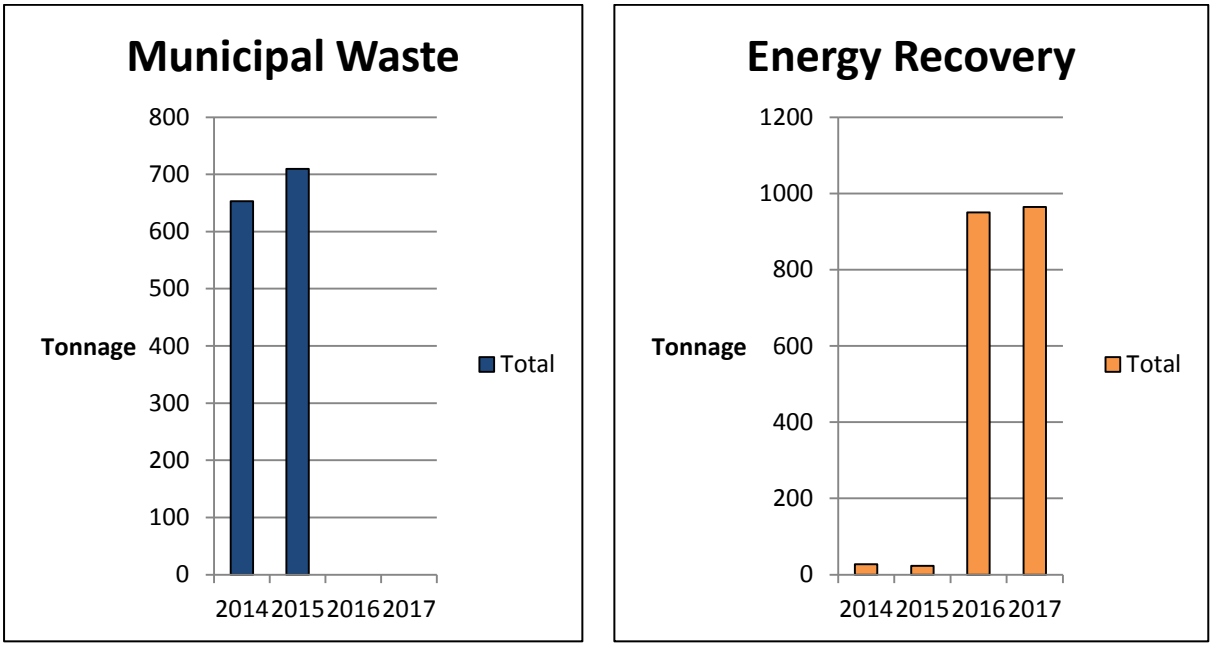
Figure 4-18 compares the health care risk waste data in tonnes for 2016/2017



Non-risk waste evaluation

General waste remains an issue due to the lack of recycling on site. In March 2017 there was local awareness drives in labs, Theatre, ICU, Dialysis, and ED. The aim was to increase energy recovery awareness which can often end up in the health care risk waste stream. The graphs below show fluctuations in municipal waste and energy recovery over the last few years. The energy recovery stream has been steadily increasing in the last few years. In 2018 the aim is to increase the recycling waste stream.

Figure 4-19 Compares Municipal Waste and Energy recovery 2014-2017



Food Waste

From 2015 to 2016 the food waste has increased by 2 tonnes, but the graph below shows a decrease in food waste when comparing 2016 versus 2017. There has been an increase in patient numbers from 700 to 800 in patients over 2016 to 2017. It was hoped that a new menu would be implemented by end of 2017 and that it would give patients more choice with smaller meals provided. In early 2018 a project of segregating waste from kitchen, canteen and patient meal service area will give exact waste from each area. The patient meal service area generates the most waste; however there could be an evaluation on the food waste from the kitchen that never makes the plate. Over producing can also lead to food waste. The Graphs below show a decrease in food waste when comparing 2016 versus 2017. There is a more awareness needed on reduction of food waste in 2018.

Figure 4-20 Compost tonnage 2016

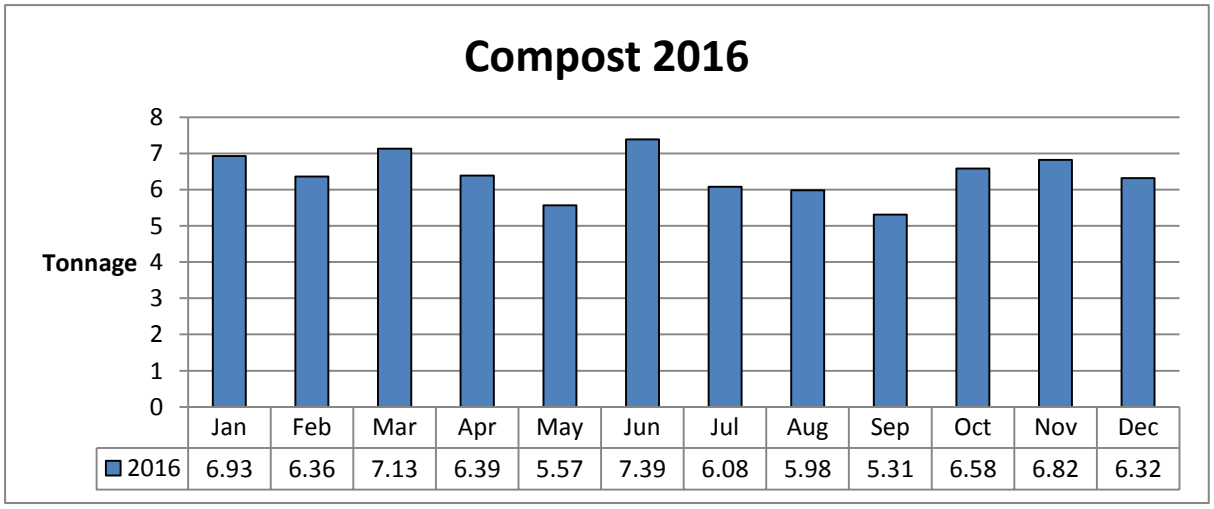
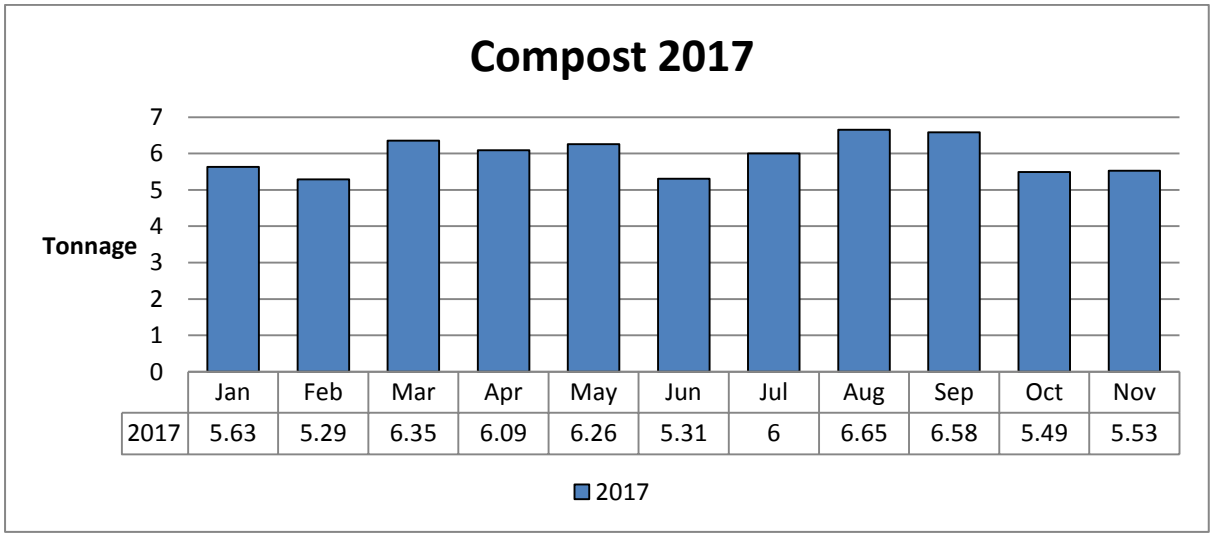


Figure 4-21 Compost tonnage for 2017



Waste Conclusion

The waste streams on campus are complex and are continuously monitored and evaluated. In 2018 with a new non-risk waste contractor in place CUH will re-introduce recycling site wide and raise awareness on waste segregation locally. The healthcare risk waste stream needs to be audited more regularly at local departments to ensure correct segregation.

5.6 Transport Monitoring and Evaluation

CUH campus is a large site with 4,000 staff and only 1100 car spaces. Encouraging staff to use public transport is difficult and there is a strain on public transport systems in Cork due to the increase in traffic around the city and suburbs. CUH will conduct a Mobility Management Survey in the coming months, which will indicate the modal splits of staff travelling to the campus. Staff surveyed in 2016, as detailed in the Environmental Review, have suggested carpooling, park &ride and more pay car spaces. On a campus close to the city there are a variety of sustainable transport modes however it's not one size fits all approach.

Figure 4-22 Modal split Targets outlook since 2010.

Mode	Modal Split (2010)	Modal Split (2014)	Modal Split (2015)	Future Split (2020)
Car - driver	75.8%	72.2%	78.3%	54.0%
Car – passenger, driver going to the same destination	2.1%	2.7%	1.7%	4.0%
Car – passenger, driver going to a different destination	1.4%	2.9%	2.4%	3.5%
Bus	2.6%	3.2%	3.9%	5.0%
Train	0.1%	0.6%	0.6%	1.1%
Motorbike/ Scooter	0.3%	0.9%	0.3%	1.5%
Cycle	1.8%	5.2%	4.6%	10.0%
Walk	13.2%	11.5%	7.4%	18.5%
Taxi	0.1%	0.9%	0.5%	0.9%
Combination	2.5%	0.0%	0.3%	1.5%

The table above shows the modal splits over the last three mobility studies. The car driver split has decreased in 2014 but then saw an increase in 2015 the increase is due

to the increase in staff on site. Bus travel has steadily increased since 2014 with the tax saver scheme on site increasing there should be a significant increase in the bus users in the 2018 mobility management survey. The use of the train is very poor; however there is a plan by the NTA to have a shuttle service directly from Kent Station Cork to CUH campus in the near future.

Tax Saver Scheme

The tax saver scheme has seen a slight increase in the last few years with more people using public transport as opposed to driving as between traffic and parking issues driving to work is neither sustainable nor good for your health. The scheme run by the government is created to give employees who use the public transports systems up to 52% reduction in the ticket. CUH have currently 38 employees using this scheme.

Bike to work scheme

The bike to work scheme has been hugely popular over the last number of years on campus. In 2016 138 people availed of the scheme. In 2017 88 people availed of the bike scheme. However majority of staff purchasing these bikes are using them for leisure rather than a mode of transport to and from the work place. It is hoped that as our city becomes more bike friendly that people will actually use the bike as a mode of transport**.**

Onsite vehicles

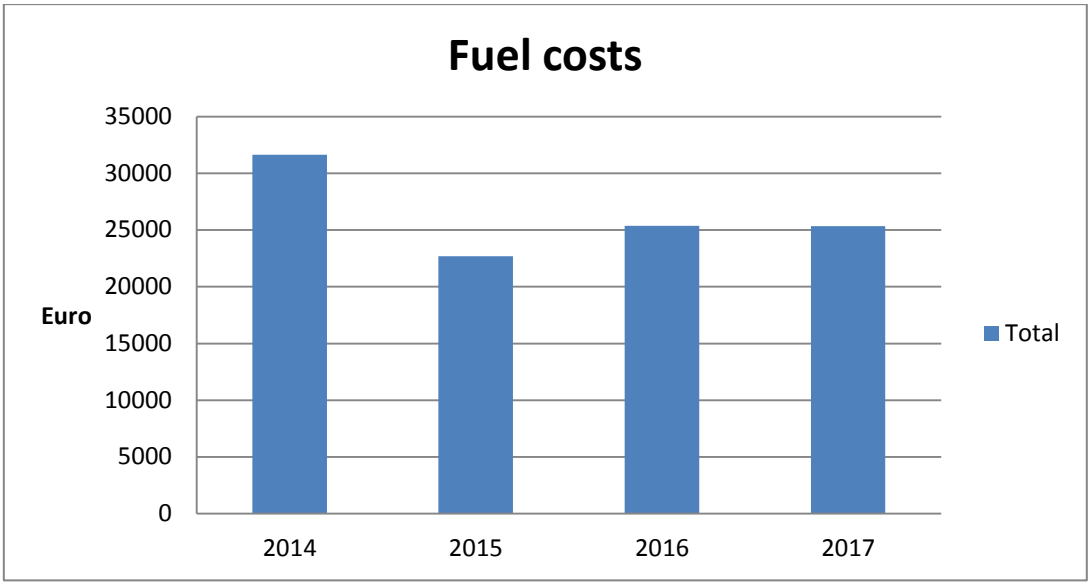
Figure 4-23 CUH campus currently has 18 vehicles;

Portering	11
Security	3
Bio-Medical Engineering	1
PM Room	1
Acute Mental Health Unit	1
IT	1

Fuel costs

Fuel Costs: Given the amount of vehicles in constant use and that some of the older fleet are not very fuel-efficient, it is not surprising that fuel costs are relatively high. The most significant cost arises on the very high mileage undertaken by Portering in transporting patients to various parts of the country. However, this has enabled us curtail taxi costs which would be inevitably be more expensive.

Figure 4-24 compares fuel cost from 2014 to 2017



Campus Bike week

Campus bike week in September 2017 give the campus an opportunity to collaborate as one team and promote cycling in the general area of Cork city. The bike week gained huge interest not only in CUH but in many venues around the city and colleges. The first cyclist meeting of 2017 gave great inside into the thoughts on cycling on campus. However it brought up the issue with lack of showering facilities in certain areas of the hospital. Students on CUH site also asked about the opportunity to have on site bikes that could be used from CUH campus to UCC campus. There is a plan to survey students and staff on campus bikes in 2018. The second campus bike week took place in March 2018 with a CUH taking part in a campus lunch time with UCC, CIT and St Johns College Cork.

Bus Eireann Awareness Day

Tax saver awareness day took place in staff canteen on in December 2017. A representative from Bus Eireann and the Sustainable Environment Officer promoted the use of public transport and give people information about the tax saver scheme and worked out the benefits for staff depending on where they travelled from. There was huge interest in the scheme and it generated huge amount of enquires and people also signed up on the day. There were also various issues discussed with Bus Eireann representative on bus delays and lack of services in certain areas around the city and suburb**.** Bus Eireann have promised to look into all complaints that come through the Sustainable Environment Officer.

Figure 4-25 Bus Eireann Tax Saver Awareness day

Transport Conclusion

Travel on campus is a very sore subject as with any suburban business. Parking is a huge issue on CUH campus, promoting sustainable travel can be difficult under the current time pressures people find themselves in. Due to traffic congestion and lack the of public transport in certain outer areas of Cork, there is often little option but to drive to work. CUH plans to collaborate with UCC in carpooling app that may help reduce the congestion and open up a large car pool group in the wider area.

5.7 Biodiversity, Monitoring and Evaluation

CUH campus is extremely proud of the progress made on the development of green spaces over the last number of years. The sustainable healthcare steering group is supportive of garden groups and the progression made year on year. The campus in continually expanding and it is extremely important to keep green spaces external and internal as a priority

Engaging employees and students with the CUH green spaces through a range of activities, from active engagement (e.g. garden groups) to passive engagement (e.g. using the campus green/open spaces to relax and enjoy lunch times) will encourage

individuals to connect with nature on a more personal level and benefit from improved health and wellbeing. The benefits of engagement are not confined to improving health and well-being. Engagement will help foster a sense of ownership, engender a sense of community and promote pride in the campus.

Garden Groups

CUH campus has five garden groups, the groups range from 2-5 people and three times yearly they gather to clean up the gardens and plant new flowers with each season. This summer 2017 we gathered the groups and got new bedding plants and trees in some gardens that will give the spaces some life. Every year CUH invests in buying new bedding plants and the groups will plant and look after them. This brings the various employees in departments to help maintain the gardens, but also enjoy spending time sitting in these spaces. It is planned to run a grow your own initiative on campus using one of the green spaces and giving employees and students the opportunity to learn how to grow simple foods in the comfort of their own home. Churchfield Trusts horticulturist has kindly offered to run this 6 week course in the spring of 2019.

Church field Community Trust Food Procurement

Churchfield Community Trust Project has been providing the Catering Department in CUH with freshly grown produce which has been served to both patients and staff for 4-5 months of the year. The produce is grown throughout the year and harvested in spring and summer to provide beautiful lettuce, peppers, tomatoes, courgettes and herbs. All are used in the dishes made in the kitchen. They also have a cafe on site that serves the fresh produce and sell the produce locally also. The biodiversity on-site is amazing with meadows encouraging pollination and growth.

Figure 4-26 Church field Community Trust Farranferris Site

Catering Courtyard Garden

The Catering Department within CUH have a huge interested in growing their own herbs on the roof space in the canteen. There are herbs grown here and used from time to time however Church field community trust has offered to plan and implement this project. Using the skills of the disadvantaged young men of North Cork City and taking part in offsite project which will look at fitting herb boxes to a small roof space. The chefs in the kitchen will then be taught by a horticulturist from CCT how to prune and look after this herb garden. This is planned for spring 2019. As pictured below this is the space off the staff canteen which would ideal for growing herbs that can be used in the everyday recipes.

Figure 4-27 Catering Herb Garden

Bird boxes and bat boxes

The bird boxes and bat boxes provided by CUH through Churchfield Community Trust will continue to be monitored for any activity. This will help inform the provision of any future such boxes at the campus.

Figure 4-28 Bird boxes and bat boxes on CUH campus

Biodiversity Conclusion

Bio-diversity in a suburban campus can be a challenge CUH will not lose focus and sight that these spaces are hugely important not just to our environment, but also to the health and wellbeing of the staff using the spaces or visitors passing through the green areas of the hospital. The campus green spaces cannot be increased but can be improved. Encouraging involvement in growing and educating employees and students on bio-diversity and its benefits will help bring the campus green spaces to life.

6 Chapter 6 - Links to Learning

Cork University Hospital is the primary teaching hospital associated with University College Cork, and there is a strong emphasis on research, education and training. Many of the Clinical staff at CUH have formal commitments within UCC and there are teaching and education facilities on site at CUH, including,

- **EDUROAM**(**edu**cation **roa**ming) wireless network service
- A modern Main Lecture Theatre with state of the art audio-visual facilities and seating for 250
- Study rooms
- IT Rooms.
- **UCC Library at CUH** - A health sciences library linked to the main college library and library reading rooms All Library registered CUH staff plus all registered UCC students, staff and researchers are entitled to use the CUH Library and its reading rooms.

A Liaison Group has been charged with developing policy and managing operational links between both organisations. The Liaison Group facilitates and promotes a common strategic approach within UCC and CUH. The Group is committed to deepening the relationship through close working relationships between all levels of both organisations. The remit of the Group includes:

- Undergraduate education and training in all health professions
- Postgraduate education and training
- Research
- Continuing professional development
- Shared facilities
- Manpower
- Primary Care and Public Health medicine, as a complementary vehicle of education and training.

6.1 The CUH Group and UCC will:

- Share relevant information and consult one another about their plans. These policies and plans will be disseminated to all stakeholders and reviewed regularly
- Consult on special interests and contribute to service, teaching and research of all senior health professional administrative appointees
- Where agreement cannot be reached at local level, request the CEO of CUH and the President of UCC to confer
- Ensure that joint appointments between the CUH and UCC are two-way.

6.2 Staff

All staff and students are given induction training when beginning employment. This includes waste and sustainability training and awareness. CUH sustainability invites all staff to get involved in becoming a green advocate for their area. The OPW Optimising power at work campaign has changed the green advocates to energy champions. The group has people from all disciplines, bio-med, maintenance, dialysis, housekeeping, labs, medical records, radiology, HSSD and nursing. The network creates team involvement in raising awareness on the ground of the energy saving measures that are being put in place. All staff and students are made aware in their areas of the campaign and the responsibility that comes with it.

6.3 Green advocates

Staff and students are invited to be green advocates and are given the opportunity to learn and share ideas within the network. The green advocates meet 4 times per year in drop in forums. The session cover sustainable healthcare, global events affecting local regions, CUH campus programme including awareness, energy water and waste, and the role of the green advocate. The green advocates are now helping in the energy journey as energy champions with a green agenda and that is creating energy awareness throughout the hospital.

6.4 Students

All students who are on placement our work part time in CUH are inducted on the subject of sustainability through waste training, locally and through PCHCAI training which covers waste and recycling awareness. All students are invited to become green advocates in their areas and are exposed to CUH sustainability throughout the hospital in the library, study facilities and staff canteen. There is representation for nursing at the sustainable healthcare steering group monthly meetings where they can voice opinions on sustainability related issues and raise ideas.

6.5 Patients, Visitors & Public

CUH campus is consistently busy with huge amount of visitors and public walking through the campus. The sustainability message is all around the hospital with a sustainable healthcare notice board by the main lifts. Patients are advised on correct segregation with signage on all bins throughout the main areas. Patients are encouraged to comment on their stay and any matters regarding sustainability are passed on to the Sustainable Environment Officer. The sustainability web pages on the CUH website show all events and campus progress through the green pages.

6.6 Campus Bike Week

Campus bike week took place from 24th September until the 29th September 2017. The campus bike week saw CUH, UCC and CIT collaborating in the message to all campuses on the healthier; more cost effective and enjoyable pass time of cycling. The bike week brought both staff and students on a week of cycling events such as coffee mornings, cycle Olympics in UCC the bike doctor in CIT and the Cork Community Bikes to CUH. All events help to raise awareness about cycling and how it makes life simpler. Parking is an issue on all three sites making it very stressful for people commuting. The collaboration linked the campuses across three sites and created awareness and introductions to fellow cyclists on the campus.

6.7 CUH Campus Student Led Project

In an attempt to engage clinical students in sustainability initiatives, CUH commissioned a hand hygiene video project in 2016. This was in conjunction with the infection control department. Nursing students were recruited to script and act in the video.

The development of a new, up to date local training tool will greatly enhance the effectiveness of hand hygiene awareness and hand hygiene auditor training within CUH. An Taisce have specified that we engage students in sustainability initiatives – effective hand hygiene is an essential tool for sustainability as every extra day a patient potentially spends in CUH due to infection has an attached energy, waste, water and food related cost. This project also contributes to the sustainability agenda at CUH.

This year, Sustainable Healthcare/Green Advocate education has been offered to UCC Nursing/Midwifery/Medical Students. CUH recognises that it needs to engage students before they begin work placements in clinical settings in order to achieve maximum benefit around behaviour and cultural change.

6.8 CUH/UCC

- CUH is the major teaching hospital of University College Cork (UCC). It is the primary teaching hospital for the UCC Faculty of Health and Science.
- One of the two undergraduates' schools for dentists in the Republic of Ireland is located in the grounds of Cork University Hospital, which is managed by University College Cork.
- A formalized Memorandum of Understanding Further strengthens this relationship between both parties.

- Professor Graham Parkes UCC has outlined a new University Wide module on Environmental Sustainability. This will be available to all UCC students and cover such diverse topics as Ecology, Environment and Law, Environment and Health and Psychology of Climate Change. The final topic of this module will deal with the Green Campus Programme. This is rolled out in UCC and UCC students who attend CUH would have access to this module.
- CUH and UCC have started meeting to collaborate on projects, such as energy meeting held in November 2017 and a workshop with all sustainability and estates teams to take place in spring 2018.
- CUH sit on UCC green campus network group.
- CEO CUH has offered CUH as a laboratory for students to carry out research on sustainability in the healthcare setting, engaging and sharing knowledge is key to this collaboration.

6.9 CUH Green Agenda and UCC

- The CUH campus Sustainable Healthcare Environment Steering Group and the Green-Campus Committee in UCC are linking and their relationship is strengthened as follows:
- Communication between the two groups on a regular basis involving the sharing of information, experiences and best practice between the two groups e.g. sharing of ideas and concepts.
- CUH and UCC have started meeting to collaborate on projects, such as energy meeting held in November 2017 and a workshop with all sustainability and estates teams to take place in spring 2018.
- CUH sit on UCC green campus network group.
- CEO CUH has offered CUH as a laboratory for students to carry out research on sustainability in the healthcare setting, engaging and sharing knowledge is key to this collaboration.

6.10 CUH student survey 2018

The Sustainable environment officer carried out a survey on 4th year nursing students in January 2018 to determine their knowledge of waste, sustainability and CUH as a green campus. Survey results attached in Appendix 10.3

7 Informing staff and involving campus and wider community

7.1 Introduction

Cork University Hospital prides its campus on staff engagement and wider community engagement. Newsletters are a significant source of communication with wider staff and Green Advocates. The CUH Green Campus journey has been shared over the last number of years to incorporate best practices with regards to energy and waste. Organisations such as UCC and CIT through engagement with green Campus have directed the Hospital to many more links in the outer community. Engagement with partners and collaborations with other community organisations and groups keeps the campus and wider community involved and informed.

7.2 Partnerships and Collaborations

- HSE Estates and NHSO(National Health Sustainability Office)
- OPW Office Public Works Optimising Power at Work initiative
- Green Healthcare Programme with Clean Technology Centre CIT
- Smarter Travel workplaces with National Transport Authority
- An Taisce, Green Campus re-assessment
- Office Government Procurement , non-risk waste tender
- Transport Mobility Forum
- University College Cork UCC
- Cork Institute of Technology CIT
- Church field Community Trust
- Cork Healthy Cities
- Haiti Orphanage Project

7.3 Sustainable Healthcare Change programme

The Sustainable Healthcare Change Programme booklet was launch by Simon Coveney in Cork University Hospital in September 2017. The booklet maps the CUH campus journey showing the steps required in keeping a campus this size on the right road to sustainability.

7.4 Sustainability external events

The Sustainable Environment Officer has been involved in various seminars and events over the last number of years. The previous Sustainable Environment Officer Edward Murphy presented at the Green campus Forum in 2016. Aoife O Connell presented in Sligo University Hospital sustainability seminar in September 2017 showcasing the Green Campus journey in CUH. In February 2018 the Sustainable Environment Officer gave an overview of the new themes and highlights of the re-assessment portfolio at the An Taisce Green Campus Network meeting. Sustainable Energy Authority Of Ireland

extended an invite to CUH Sustainability Officer to speak on the Optimising Power@ work initiative being run on campus.

7.5 National Health Sustainability Office

In 2013 the HSE established the National Health Sustainability Office (NHSO) in order to develop and build staff, patient and public awareness of sustainability related issues within the Irish health system and deliver a healthier environment while at the same time keeping costs low. The NHSO has 7 pillars which include Communications and Engagement, Energy Efficiency, Water Conservation, Waste Prevention, Sustainable Transport, Green Procurement and Built Environment. The NHSO engage with the Sustainable Environment Officer and Waste Officer through waste issues, energy management and green procurement.

"Sustainable development is about human wellbeing – enabling people to lead healthy and economically productive lives in a healthy environment, without compromising the ability of future generations to meet their own needs"

7.6 OPW Energy Awareness Campaign

The Office of Public Works started running the Optimising Power @work campaign in CUH in September 2017. This energy campaign is to create staff awareness and help to re-energise people's behaviour when it comes to energy usage in the workplace. The Campaign promises to create awareness around the savings that can be made on campus, savings that could be better used in patient care. Focusing on each department they propose to work with the sustainability office to create champions in each area that can help to make a difference to the overall energy consumption in CUH. The optimising power @work initiative, recruited green advocates and staff from all departments to become energy champions. In total 17 energy champions signed up and the first meeting took place in November 2017. Monthly energy champion meetings will take place for the next 24 months and continue to make progress on reducing the energy consumption on site.

7.7 Energy Awareness day 7th November 2017

The awareness day was a success giving staff and student's information on energy in the home and how to save money by changing light bulbs and setting timers for heating and lighting.

Figure 7-1 Energy Awareness Day

7.8 Clean Technology Centre

Clean Technology Centre has worked in partnership with CUH for many years. Over the last number of years the centre has worked on food waste initiatives, bin location guidance and last year a water survey was carried out on campus. The work carried out has guided CUH on the sustainable healthcare path and has given excellent advice and recommendations on how to reduce waste in healthcare facilities. CTCs work on Green Healthcare is co-funded by the EPA and NHSO within the HSE.

7.9 Transport Mobility Forum (TMF)

The CUH Sustainable Environment Officer engages with the Transport Mobility Forum and is actively campaigning for expansion of the coca cola bikes share scheme to the hospital campus. This group also acts in conjunction with the NTA(national transport authority) which monitors public transport cycle paths and all travel related issues in conjunction with Cork City and County Councils.

7.10 Churchfield Community Trust

The expansion of sustainable healthcare initiatives came when CUH reached out to the local community. This idea was born from a simple conversation in UCC a few years ago

when the catering officer from CUH Sustainable Environment Officer and Cork Healthy Cities Co-ordinator met and discussed with UCC a possibility of growing our own produce. The thought was initially to utilise some green space in CUH. However the local supply project reached out to the community and hence Churchfield Community Trust came on board and it started to supply CUH Catering with fresh local produce in 2016. In 2017 the produce increased, both salads and vegetarian options made it to the patient's plate.

Figure 7-2 Pictured above Cork University Catering Team with Churchfield Community trust workers.

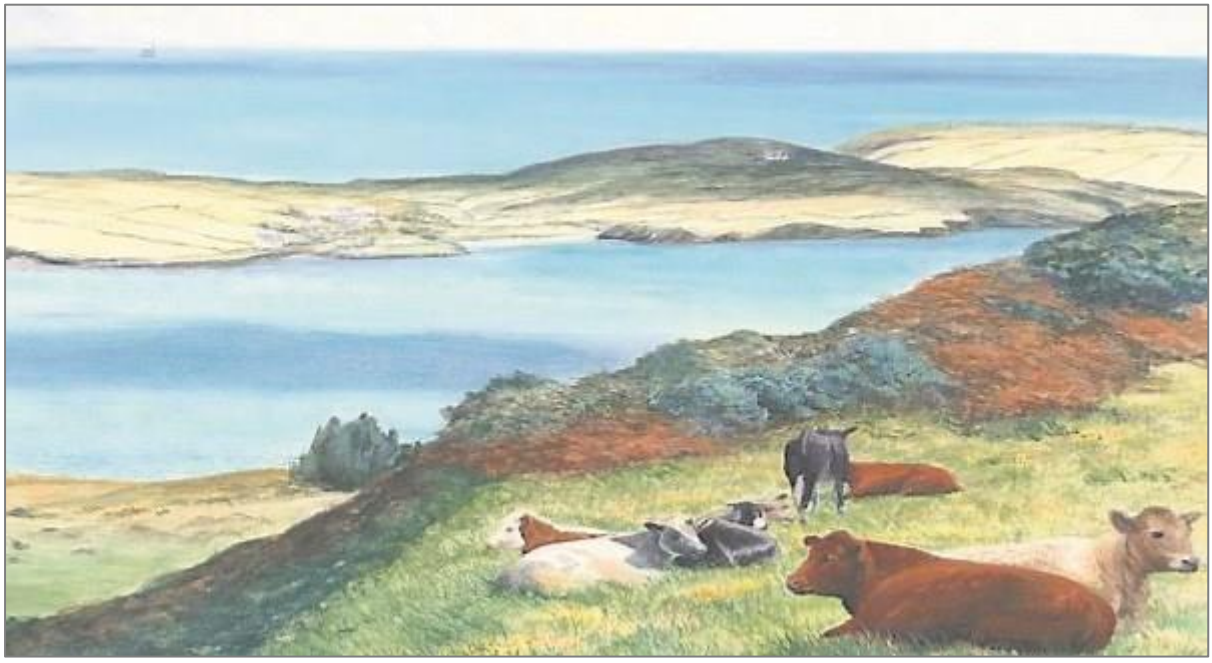
7.11 ART booklet and wider community

CUH has the largest art collection in the country. All of the art is sponsored and donated by various groups. There is a huge community input into the art in CUH as a patient may paint or draw a picture or write a poem after spending time in hospital as either a patient or a visitor. Art catches our eye and gives emotions a picture felt by all of the internal hospital community as well as the patients and visitors. There is a sense of feeling around the communication of art that brings us together. We provide student placement opportunities from Art Therapy students from the Crawford College of Art and Music CIT in the Community students from the Cork School of Music CIT. There are regular annual exhibitions at the CUH Gallery in the staff dining room.

These include:

- A CUH staff art exhibition
- (December/January), A Cork Mental Health Foundation exhibition
- (early Spring), A focus on the collection of an artist (late Spring),
- Student end of year shows (Summer), Arts and Health dimension Focus
- (Summer/Autumn), Artist in residence show
- (Autumn and intermittently), community based arts and touring Arts & Health shows.

Figure 7-3 'Largest public art collection in Ireland' donated to CUH. Artist: Majella O'Neill-Collins



7.12 Staff/ Student Engagement

A recent drive for new Green advocates recruitment began in July 2017. Training was provided for new members and also an update was given to current green advocates. In September 2017 we began the Optimising Power at Work initiative that recruited green advocates and staff from all departments to become energy champions. In total 17 energy champions signed up and the first meeting took place in November 2017. The bi-monthly newsletter gives staff information on up and coming events and general sustainability information. The sustainable healthcare office now delivers a presentation on waste to all medical students on orientation week. This year a sustainability presentation was delivered to the 4th year nursing students by the sustainability project co-ordinator. It is hoped that this presentation will be delivered to all nursing students throughout the year.

7.13 Green campus notice board

The two campus notice boards are managed by the sustainable environment officer; the notice boards have the most up to date information on campaign running. The board has the most up to date information on waste and the current optimising power@ work campaign running on campus for the next 24 months.

7.14 Sustainable Green Campus Website Page

The CUH green pages can be accessed through the CUH about us on the main website page. The section on Achieving Sustainable Healthcare & Living breaks down into sections such as Our Commitment, Sustainable Healthcare, Our Community, Get Involved, Publications and Events, Monthly Green Newsletters, resources and downloads and Contact. The information has been updated recently with a new newsletter and the sustainability 2016-2017 change booklet launch. All information is accessible to staff, students, patients and visitors. The Green pages need to be up dated next year as part of the new action plans and campaigns being launched. http://www.cuh.hse.ie/About-Us/Achieving-Sustainable-Healthcare-Living/Sustainable-Healthcare

7.15 Haiti Orphanage Project

CUH has developed a relationship with local charity called Haiti Orphanage Project. Some hospital items such as old beds, mattresses, patient bed lockers and other items that are being upgraded and replaced during refurbishments are now shipped to Haiti for reuse rather than being disposed of.

8 Green Charter

http://www.cuh.hse.ie/About-Us/Achieving-Sustainable-Healthcare-Living/CUH-Green-Charter.pdf

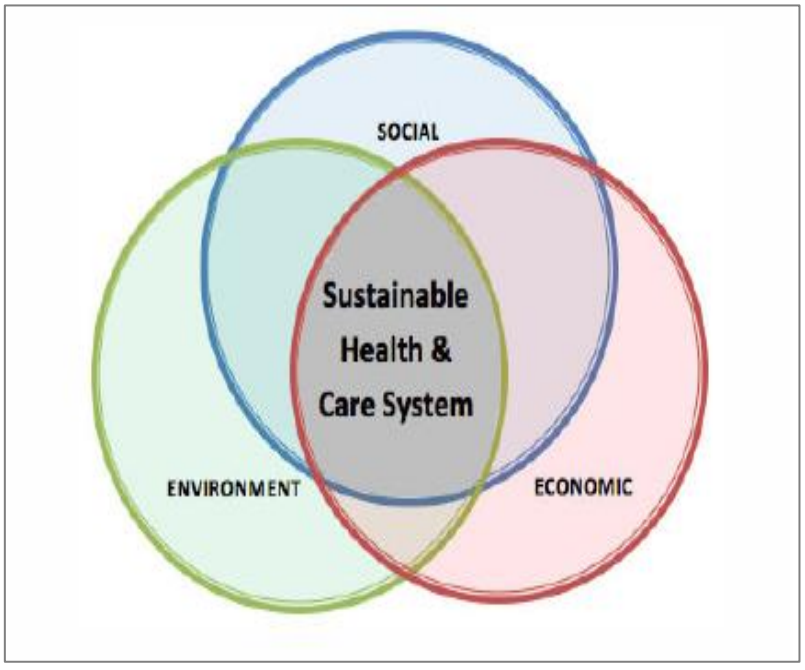
8.1 Introduction

The CUH campus is committed to

- Promoting a sustainable environment in healthcare and wellbeing
- Reduce carbon emissions to help combat climate change
- Deliver excellent healthcare services while achieving a sustainable environment
- Continue to build on the green advocate network with more eyes and ears on the ground

The Green charter identifies the targets and actions related to all sustainability themes. The charter gives a concise guide to the campus 'this is how we do things here' and is a means by which the campus community can achieve the aims through specific advice and information. The document summaries all actions that the steering group propose to achieve over time.

The charter will reflect the identified areas of interest under the three pillars of sustainability; Social, Environmental and Economic. The three pillars of sustainability often overlap, for example energy efficiency and waste reductions are both Environmental and Economic, with transport and travel options belonging in social environmental and economic sustainability pillars.



The CUH Green Charter is available to all staff via Q Pulse document management system; it is available to patient's visitors, and staff via the CUH green pages.

8.2 Energy targets

- Reduce energy use by 33% by 2020
- Increase renewable energy integration by 2%
- Reduce Green House Gases by 3% PA average by 2020
- Prepare a Climate Changer Plan for CUH campus by 2018

8.3 Energy Actions

- Reduce energy consumption wherever possible.
- Give our campus the 3 a day, 1. Close windows 2. Close blinds 3. Switch off all equipment.
- Set air conditioning units at 19-20 degrees. Turn off when not needed.
- Heating 'keep it at 20 degrees'
- Use the stairs instead of the elevators

8.4 Energy ICT Actions

- Activate the stand-by mode & power saving functions on PC, printers and photocopiers/fax machines.
- Turn your screen off at break time & lunch time
- Power down office computers and non-essential computers printers etc each evening, at weekends, & before holidays.
- Run paperless meetings-provide electronic meeting documents instead of printouts
- Use email/text messaging in place of snail mail and fax whenever possible.

8.5 Water targets

- Reduce water use by 5% in 2018
- Increase water reuse and recycling (rejected grey water from reverse osmosis plant) by 2% by 2020
- Reduce waste water released by 5% 2020 and reduce Biological Oxygen Demand (BOD) to 150 mg/l by 2020

8.6 Water actions

- Reduce water consumption where possible e.g by only boiling as much water as needed in the kettle, encourage 3 minute showers.
- Be aware and use the dual flush buttons of toilet
- Don't use the toilet as a waste bin
- Don't dispose of expired/waste milk down the drain
- Use filtered water in canteen instead of buying bottled water.

- Any dripping taps, leaking pipes, broken toilets should be reported to the maintenance dept.

8.7 Waste Targets

- Reduce waste disposal costs by 10% by 2018
- Increase recycling rate by 0.3kg/per patient bed day by 2018
- Reduce healthcare risk waste by 0.60kg/per patient bed day by end of 2018
- Reduce food waste by 0.30kg/per patient bed day by end of 2018

8.8 Waste Recycling Actions

- Follow bin signage guidelines for recycling
- Recycling on campus includes: plastic, paper, aluminium cans, ink cartridges, cardboard, mobile phones, postage stamps, batteries WEEE equipment, glass, florescent tubes, and old furniture.
- Bring your own mug
- Empty used paper coffee cups and plastic water bottles and plastic glasses can be recycled.

8.9 Waste management actions

- Follow the bin signage placement guidelines
- Strictly adhere to the Healthcare Risk Waste Segregation guidelines
- Stop food waste-order/bring only what you will eat; don't over order food and milk for pantries.
- Non-infectious incontinence waste can be disposed of in clear bags.
- Put litter in waste bins.
- Decrease use of disposable cups on site by 50% by 2019

8.10 Transport and travel targets

- Get 20% of all staff to use sustainable transport by 2020
- Reduce single occupancy car use by 5% by 2020
- Hold pedometer Challenge annually
- Increase bicycle/bus and rail use through increased awareness days and encourage the tax saver scheme and cycle to work scheme.
- Increase uptake of tax saver scheme by 5% in 2018

8.11 Travel and transport actions

- Walk or cycle or take the bus whenever possible (link to web site)
- Avail of the cycle-to-work scheme (link to web site)
- Carpool with others who may be travelling from the same area where possible.
- Use Tele/video- conferencing whenever possible
- CUH to take part in Smarter Travel Workplaces pedometer challenge

8.12 Biodiversity Targets

- Carry out a habitat/species mapping exercise with UCC by end of 2018
- Increase the number of native trees on site by 2021
- Attract bird life to campus
- Map campus walkways by end of 2018

8.13 Biodiversity Actions

- Buy products from companies that value the environment and people.
- Support fair trade purchases and cafes
- Participate in bio-diversity initiatives e.g. Bird Watch Ireland events, building, positioning & monitoring of bird boxes
- Encourage bio-diversity at home with grow your own project running in 2018

8.14 Sustainable Healthcare Targets

- Enable the re-configuration of services away from the acute settings
- Capture sustainable healthcare & living changes on how we deliver care and use health and care services on CUH campus
- Become more involved with Healthcare Without Harm/Global Green Healthy Hospitals by end of 2018

8.15 Sustainable Healthcare Actions

- Promote, support and practice sustainable healthcare clinical and care models when deciding what is right for the patient. This may include
- Prevention and early intervention:
- Such as staff and patient vaccination programmes, fall prevention program and medication safety program
- Enablement & support:
- Such as patient support programmes directed to ensure better drug adherence and compliance

8.16 Self-Management

- Such as wound management, home dialysis programme and self-management hospital dialysis
- Acute and specialist help following and emergency or an episode of significant ill health or injury;
- Such as rapid access clinics, and rehabilitation programme for patients following heart attack
- Dying well; Hospice-friendly Hospitals (HFH) programme.
- By striving to ensure that everyone has a caring, careful death and a patient will die with dignity and that later there will be support for their families.
- Raise awareness and get involved in the joy of living through the CUH Campus Arts Programme, contact arts coordinator on 21394

- Continue to learn more about sustainable clinical and care models.

9 Conclusion

The green campus programme is a long term commitment for CUH campus. The sustainable healthcare steering group are fully supportive in the retention of the Green Campus Flag award going forward for re-assessment and the annual renewal. The campus has demonstrated the progress with maintenance themes and new themes taking in to consideration the expansion on site and increase in activity throughout the green campus journey. CUH mission is the delivery of high quality healthcare. Sustainable development is about human and environmental wellbeing, enabling people to lead healthy and economically productive lives in a healthy environment, without compromising the ability of future generations to meet their own needs. A sustainable health service will deliver high quality health care and lead to improved public health whilst reducing the impact on the environment.

To ensure the Green Campus Programme continues CUH campus will ensure the following

- Sustainability continues to be embedded into the organisational structure
- The steering group will continue to meet monthly, and where positions become vacant the chair will formally invite new members.
- Green charter; continue to implement actions for all themes.
- NHSO Sustainability Strategy will be implemented in CUH
- Green advocates/Energy champions are continually involved in sustainability projects and actions to improve our sustainable healthcare
- Monitor and evaluated all themes continually
- Link the student learning on campus with surveys and awareness

The HSE Directorate established the National Health Sustainability Office (NHSO) to develop and implement national sustainability strategies within the HSE. The pillars include communication & engagement, energy efficiency, water conservation, waste prevention, sustainable transport, green procurement and designing the built environment. These pillars have given CUH campus key actions to focus on over the next few years, allowing this green campus to expand in themes and improve sustainable healthcare with the help of the NHSO. For more information www.hse.ie/sustianability

Under the leadership of the CEO CUH, HSE South Estates Manager, the Energy Champion, Sustainable Environment Officer, Waste Officer and its partners, the CUH SEECO Program model has raised awareness of sustainability issues and the cost of energy, water and waste disposal and changed the organizational culture, attitudes and behaviour in a positive way.

The model is innovated in its approach to have successfully integrated sustainability into existing CUH campus accountability, reporting and communication structures; linking the 'back house ' and 'front house' elements of energy / sustainability; creating a communication network to actively engage in winning the hearts and minds of CUH staff and students while providing public information and raising awareness.

The re-assessment for the Green Flag accreditation was a challenge, having a new Sustainable Environment Officer and three new themes it made the journey one of learning and creating new goals based on previous research and new reading. The maintenance themes awarded for the first green flag had gone through a life cycle and the new challenge was to bring new ideas and communicate the changes. The energy campaign in 2013 the power of one has taken a new shape in the form of optimising power @ work 2017 The green advocates are now energy champions to see the reduction in energy consumption project through. The waste has changed considerably due to contactor issues and increased site activity, however with new non-risk contract and new goals it can be reduced considerably.

The new themes were considerably different as transport, water and biodiversity were discussed and evaluated in the steering group, but there has been considerable work done in the last two years on building new plans and networks around these themes. Transport has become more difficult to manage due to constraints of traffic, family life and people wanting to get from A to B in the comfort of their own vehicle. The campus has a responsibility to reduce one driver travel but to do this the national transport authority will have to provide adequate services to support. Water usage has changed over the last number of years as people have to now consider the value of water being wasted. In the acute setting the water usage is extremely high, in this instance awareness of over usage of water and breaking bad habits will change the consumption considerably on campus. Bio-diversity on a suburban campus is possible with the amount of green areas and internal garden spaces. There are now 5 internal garden groups that have brought these spaces to life. The bio-diversity theme has just begun with new goals to be achieved in the next few years.

The CUH SECCO Program has the ability to motivate, innovate and influence people attitude towards sustainable healthcare. Ideas born from people on the ground and community influence have become what is today the CUH Green campus Programme. The Campus will continue to move towards a healthy more sustainable environment for all.

10 Appendices

10.1 Agenda and Minutes of Sustainable Healthcare Steering Group

Cork University Hospital

Sustainable Environment / Healthcare Steering Group

AGENDA

Tuesday 16th December 2017 Time: 3.00pm Venue: Board Room

- 1. Minutes of Previous meeting
- 2. Matters arising
- 3. Greenflag Document Update
- **Energy update**
    - Optimising Power @ work
    - Energy Co-ordinator
- **Waste update**
    - Waste update
    - OGP Update
- **Biodiversity update**
    - Crutch art project
- **Water Update**
    - Plans for 2018
    - Leak detection programme 2018
- **Transport/ smarter travel workplace**
    - Electric Vehicle
    - Car charging units
    - Mobility Management update
    - NTA Update
- **AOB**
    - HSE Sustainability Strategy
    - Catering Pilot project plan
    - Sustaining Viable Rural Communities

Next Meeting: Tuesday 13th February in the Boardroom at 3pm.

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Sustainable Healthcare & Living

CUH
Ospidéal Ollscoile Chorcaí
Cork University Hospital

Cork University Hospital Campus - Sustainable Healthcare / Environment

Steering Group Meeting

Minutes - Meeting Held *Tuesday 14th December @3.00pm Board Room*

Location of meeting: Board Room

Chair Mr Tony McNamara

Secretary Ms Aoife O Connell

Name	Title / Dept	Present	Apologies	Absent /Representative
Mr Tony McNamara	CEO Chair	✓		
Mr Patrick Murphy	Engineering Officer CUH	✓		
Mr kieran Twomey	HSE Estates		✓	
Mr Alan O Connell	HSE Estates Manager		✓	
Ms Marie J Mccarthy	Services Manager CUH	✓		
Mr Donal McCarthy	Head of Security	✓		
Ms Aoife O Connell	Sustainable Environment Officer	✓		
Mr John Bohane	Biomedical Engineer	✓		
Mr Finbarr Buckley	Portering		✓	
Ms Ann Moran	NPDC	✓		
Mr John Kingston	CUH Advisory Group			✓
Ms Michelle Kiely	Nursing Student		✓	UCC Students at lectures
Ms Megan Buckley	Nursing Student		✓	UCC students at lectures
Ms Laura Mitchell	UCC Representative		✓	

Ref No.	Agenda Item	Minutes
		Noted above.

	An Taisce	The green flag re-assessment update, Chapters 1-5 complete and chapters 6,7 and 8 are in progress. All chapters need to be formatted and headers and footers added. Also conclusion and appendices to be completed. It is expected to be handed over to Deidre O Carroll by the 15Th January. Chapter 6 in Green flag document needs CUH to show student engagement in linking sustainability and learning on campus. Suggestions from the group on possible field trips to Green star site, or tour of the waste yard on CUH campus. Ann Moran to discuss further with Nursing co-ordinators and UCC on possible projects in 2018. Aoife will survey the 4th year nursing students on sustainability awareness on the 9th Of January. Action Aoife
	Energy Update	Optimising power @ work update. In the month of November the group took part in logging temperatures in 35 departments. This data was then given to the OPW consultants who designed a heat map based on these readings. The map gave an indication as to how the heating in the hospital was performing. The heat map will be shared with the group once received. It was suggested that a survey is to be undertaken in nurse's home building to see how people use energy. Pj suggested reading meter before and after the survey to see if there were behavioural changes after the survey. The survey is due to take place 4th week of January and will be rolled out on survey monkey to all working in the admin building. Action Aoife/Ann/PJ PJ also agreed that having an onsite energy co-ordinator would be beneficial to all energy projects. PJ has discussed with on site contractor ACE controls the possibility of running the energy projects and monitoring BMS systems. There employee an Energy Co-ordinator early 2018. Action PJ
	Waste Update	Waste update: non-risk waste is slightly down overall. The HCRW has increased over the last two months. A survey of HCRW needs to take place in January to look at the individual departments and how it can be improved. The OGP non-risk tender evaluation is due to take in mid January. Aoife will keep group updated throughout the process
	Water	-Current water projects -New showers heads for remainder of the hospital 90k needed -R/O system dialysis to be considered late next year -Step tests took place on site last week of December. -Metering to be installed at a cost of 30k. -Annual leakage tests be implemented on site 13k -All taps on campus to be looked at to reduce flow rates. Aoife and estates to discuss in new year

5.	Transport	Bus Eireann on CUH campus in December promoting tax saver scheme, it generated huge interest with more employees signing up to the scheme. CUH have been refused funding for car charging units, PJ will call Electric Ireland again to negotiate a possible sponsorship. Mobility Management plan rolling out in January 2018. NTA have no update on a possible shuttle service from Kent station directly to CUH. Awaiting update from John Kingston on possibility of a sponsored electric vehicle for CUH campus. Funding has been sought for upgrade of nursing shower facilities. Aoife will keep group updated throughout the process
6.	HSE Sustainability Strategy	This draft QIP developed is based on the HSE Sustainability Strategy pillars and actions. It will give a road map to CUH sustainability goals in line with the HSE Sustainability Strategies. The document will act as a guide with actions not yet agreed upon with all disciplines; it is a work in progress and will be added to the agenda for discussion. No progress made on this document. The group will start working on the QIPs once green flag document has been handed over to An Taisce.
9.	AOB	-Website; the website was updated with November newsletter, sustainable change booklet. More work needs to be done on updating the website in the new year.

10.2 Waste Audit Checklist

Standard No.12 – Waste Management		
Ward: _____ **Date:** _____		
64 criteria in total	The inventory, handling, storage use and disposal of hazardous materials, sharps and waste is in accordance with evidence based codes of best practice and current legislation	
Target	**Actual**	**Variance**
85%		

	Results					
Sharps Management 3 Areas to be checked Indicate area	Clean Utility		2		3	
1) **Sharps bins** are assembled correctly and details completed	Y	N	Y	N	Y	N
2) Sharps bins have not been overfilled above the manufacture's guideline, are free of protruding sharps ant not more than ¾ full	Y	N	Y	N	Y	N
3) Sharps bins are stored appropriately off the floor in an approved holder or secured by an approved bracket	Y	N	Y	N	Y	N
4) Sharps bins and brackets are clean	Y	N	Y	N	Y	N
5) The temporary closing mechanism on the sharps bins is engaged during transportation of the sharps bin and when not in use	Y	N	Y	N	Y	N
6) **Sharps trays** are compatible with signed sharps bins and are available for use at point of care	Y	N	Y	N	Y	N
7) Sharp trays in use are visibly clean	Y	N	Y	N	Y	N

Resuscitation Trolley	Result	
8) **Resuscitation trolley** An appropriately assembled **empty** and signed sharps bin is available.	Y	N
9) **If present** check that the sharps bin next to the blood gas analyser is signed, clean and stain free	Y	N
10) Needles and syringes are disposed as one unit	Y	N

Bin Codes: R (Risk); NR (Non Risk); RC (Recyclable)
Enter bin code below, with result

Waste Management Indicate area and bin type	Sluice or Dirty Utility		Clean Utility		Area 1		Area 2	
11) Waste bins are foot operated and lids close correctly	Y	N	Y	N	Y	N	Y	N
12) Waste bins are clean and well maintained	Y	N	Y	N	Y	N	Y	N
13) Waste bins have the correct screen printed labels	Y	N	Y	N	Y	N	Y	N
14) Waste bin bags are no more than ¾ full	Y	N	Y	N	Y	N	Y	N
15) Waste is segregated into correct waste bins and segregation is in line with national colour coding system	Y	N	Y	N	Y	N	Y	N

Patient Rooms Indicate room/area	1		2		3	
16) Waste bins located in patient rooms have silent closure mechanism	Y	N	Y	N	Y	N

17) Contained Liquid waste is disposed in an approved rigid bin with an absorbent mat. The bin is no more than ¾ full	Y	N	NA
18) **If applicable** e.g. in CUMH and theatre an additional absorbent mat has been added to the bin to help absorb excessive liquid	Y	N	NA
19) **Poster** Segregation & Packaging of HCRW/HCNRW poster on display	Y	N	

Waste Storage Areas		
20) Healthcare waste packaging is stored in secured location which is inaccessible to unauthorised personnel	Y	N
21) Facilities are available for the storage of clinical waste in a secure designated sub-station area at point of origin until collection	Y	N
22) This facility is locked and inaccessible to the public	Y	N
23) This facility should be well lit and have washable walls and floors which are resistance to detergents and disinfectants	Y	N
24) There are permanent warning signs displayed indicating restricted access to this area	Y	N
25) The floor area is clean, dry and intact	Y	N
26) Walls and surfaces are clean, dry and intact	Y	N

Bin Codes: R (Risk); NR (Non Risk); RC (Recyclable)

Check 1 of each bag type	**R**		**NR**		**RC**	
27) Waste bags are less than 2/3 full and there is an adhesive label attached identifying the ward of origin	Y	N	Y	N	Y	N

28) Healthcare risk waste bags are secured by means of **swan neck closure and have the blue traceability tag**	Y	N
29) Healthcare Risk Waste bags are less than 2/3 full and there is an adhesive label attached identifying the ward of origin of healthcare non-risk (HCNRW) bags and recycling bags	Y	N
30) Sharps bins and rigid bins are locked, signed and **have the blue traceability tag**	Y	N
31) The large rigid wheeled containers are clean, dry and intact	Y	N

10.3 Nursing Student Survey

Waste and sustainability survey

By filling out this survey you are agreeing that the information collected can be used for reports and documents in the future. Any individual participating in this survey will remain anonymous.

Please circle the answers that in your opinion appropriately answers the question

1. Which of the following waste streams to your knowledge are generated on campus?

a. Health care risk waste.
b. Sharps bins
c. Recycling waste
d. Landfill waste
e. Food waste
f. Energy recovery

2. Which colour waste bins are you familiar with on campus?

a. Yellow bin
b. Sharps bin
c. Green bin
d. White bin
e. Brown bins

3. Are you aware of the existence and availability of CUH waste Policy Document?

a. Yes
b. No

4. Do you fully understand how to segregate your waste correctly?

a. Yes
b. No

5. Do you feel that waste segregation is important in an acute hospital environment?

a. Yes
b. No

6. Do you feel there is appropriate training given relating to waste segregation?

a. Yes
b. No

7. Were you aware that CUH is a green campus?

a. Yes
b. No

8. Did you know that CUH campus has been awarded and is a current holder of a green flag.

a. Yes
b. No

9. My concern towards environmental issues has grown due to the events, activities and /or course promotion offered by my campus.

a. Strongly agree
b. Disagree
c. Agree
d. Strongly agree

10. I fully understand the meaning of sustainable healthcare and its importance!

a. Yes
b. No

10.4 Bin Location guidance

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Waste Management Bin Location Guidance Criteria

Do Place Yellow Approved Health Care Risk Waste (HCRW) Bins

1. In Dirty Utility / Sluice Room
2. In specialist areas near patient activity such as Operating Theatres and Intensive Care Units
3. Isolation rooms/isolated bed spaces
4. Clinical treatment areas

Do Not Place Yellow Health Care Risk Waste (HCRW) Bins

1. In public areas i.e. multi bed wards or public corridors.
2. Near the entrance to rooms with the exception of patient isolation room
3. Next to hand wash sink / station
4. Near patients beds in wards and departments where the bin is easily accessible

Do Provide the Right Size Bin for the Correct Location based on Clinical activity i.e. where waste is generated and where waste bin is actually needed.

- Small
- Medium and
- Large

→ Order from procurement, General Requisition Book

Green Recycle Bin & White Land Fill /Health Care Non Risk Waste (HCNRW)

- Position adjacent to each other to enable staff to choose appropriate waste stream for disposal
- At hand wash station position the white landfill /HCNRW bin near the sink with green bin beside where feasible
- Use Office bin with green recycling bags in Offices / Admin / Reception areas

'Do the Right Thing' - Segregate Correctly

- Display the Segregation & Packaging of HCRW / HCNRW Poster in a prominent & suitable location
- Attend hospital mandatory training program - on PCHCAI
- Only recycle approved items – refer to hospital list/posters
- Use waste bag in procedure/ dressings packs
- Bring only materials required into isolation rooms
- Keep stock levels low in isolation rooms
- Recycle glass, batteries and boxes in the appropriate waste stream
- Compost fruit, coffee grinds, tea bags in Brown Compost Bin
- If in doubt seek advice from experts e.g. Waste Officer

Do not use any waste bins as a Door Stop


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