



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

UWTSD EMS Review

ENERGY CONSUMPTION

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List of Abbreviations

Abbreviations	Definitions
DEC	Display Energy Certificate
DTC	Dylan Thomas Centre
EMR	Environmental Management Representative
EMS	Environmental Monitoring System
ISO	International Organisation for Standardisation
PDCA	Plan, Do, Check, Act
SLT	Senior Leadership Team
UoB	University of Bristol
UWTSD	University of Wales Trinity Saint David

1. Introduction

An environmental monitoring system (EMS) is a tool used by businesses and organisations to help monitor and reduce their environmental impacts. While an EMS is not mandatory for an organisation to attain, having an accredited EMS not only reduces environmental impacts but has also been shown to improve the reputation of businesses by showing an awareness of their actions and a responsibility for their resource use and impact on the environment both local and on a larger scale (Wang et al., 2022).

This report will assess the effectiveness of the University of Wales Trinity Saint Davids (UWTSD) EMS by conducting an audit on a number of university buildings. Results found will then be compared with current internal EMS documents to understand how fit for purpose the current EMS is and the potential reasons for any shortfalls found. While EMS' cover a wide range of environmental topics, this report will primarily be focusing on the energy consumption of the university.

2. Methodology

In order to assess the effectiveness of the current UWTSD EMS, an audit was conducted on a number of buildings under the UWTSD umbrella including the IQ building, Y Fforwm, The Dylan Thomas centre (DTC) and Dynevor. These audits were conducted throughout February and March and covered a range of areas such as waste management, COSHH, energy usage, pollution and other general environmental aspects of the buildings. The process included a walkthrough of the buildings as well as talking with members of staff who work and occupy the spaces.

The goal of these audits was to assess how effective the current EMS system is. The EMS identifies a number of aspects in the Register of environmental aspects document (UWTSD, 2025d). Aspects are elements of an organisation that can affect the environment and can include waste, construction and emissions. These aspects are then given a significance evaluation score which is calculated based on the consequences as well as the likelihood of an impact on the environment (Figure 4). This provides a priority in the most impactful aspects. This document also contains legal compliance references which link to a document containing all the legislation linked to these aspects that the university has to comply with (UWTSD, 2025f). In order to reduce the universities impact from these aspects, the university provides guidance through the form of operational procedure documents which outline best practices for staff to follow to reduce their environmental impact.

In order to make sure organisations EMS are effective and up to scratch, The International Organisation for Standardisation (ISO) published ISO14001:2026 which is an international standard for designing and implementing an EMS (ISO, 2026). This creates a framework and provides guidelines for creating, monitoring and applying an EMS to organisations. While the university is not ISO accredited, it provides best practice guidelines and will be referred back to throughout this report. ISO14001:2026 and all EMS' is based on the Plan Do Check Act (PDCA) cycle which aims to implement continuous improvement within the organisation.

Results from this Audit will be compared with these documents as well as external documents such as from other universities EMS and other best practice in the industry to determine how well the UWTSD EMS has been implemented.

3. Audit Results

This section will cover key findings from the audit regarding energy efficiency. During the audit a number of aspects were looked at including waste, COSHH and other environmental impacts and while these aspects are important to monitor, they are outside the scope of this report which will look only at energy use and efficiency.

As this EMS audit review will be focusing on energy consumption, one key indicator of energy efficiency in commercial buildings is the energy rating that is required under The Energy Performance of Buildings (England and Wales) Regulations 2012 (UK Government, 2024). This legislation requires all buildings with useful floor space above 250m² to display an up to date display energy certificate (DEC). All of the buildings achieved a rating higher than D which is considered a typical building however, out of the 4 buildings audited, 3 of the 4 certificates on display at the entrance of the buildings were expired (Figure 1). After checking the governments database for DEC certifications, it was found that a number of the buildings have up to date DEC ratings, but they have not been displayed which goes against the universities legal obligations.

Building	2020	2021	2022	2023	2024	2025	2026	Expiration dates
IQ	C	C	D	<u>D</u>	<u>D</u>	-	-	31/08/2024
Ffworm	-	-	C	C	A	<u>C</u>	<u>C</u>	29/09/2026
DTC	-	-	-	D	D	D	D	30/08/2026
Dynevor	-	-	C	B	B	B	-	31/08/2025

Figure 1 DEC rating of the buildings per year as stated on the certificates. Underlined ratings were not present in the buildings and were found online (UK Government, 2026)

3.1. Lighting

In terms of lighting for the buildings, many of the light fixtures are controlled manually via a light switch with a few select rooms being controlled by infrared sensors to detect movement. 2 staff members who were interviewed expressed how light sensors in their areas of work were inconvenient and 1 staff member even noting asking management to have light sensors removed as it was impeding work going on in the workspace. Generally most staff members that took part in the audit discussed how when a room is not in use they manually switch off the lights in order to conserve energy. However, walking around the building showed a number of rooms with lights on which were not in use and while this wasn't every room there was still a lot of lights being left on unnecessarily.

3.2. Heating

A number of rooms across the campus including the CWIC workshop in IQ and the ceramics workshop in Dynevor have heating systems which appear to be ineffective. Specifically the heating system in the CWIC workshop was particularly ineffective. The design consists of a row of radiators attached to the ceiling with a fan planned to be attached to circulate the warm air down throughout the room (Figure 2). It was claimed that this element was designed out of the system for budgetary reasons. While the reason for this change hasn't been verified, the radiators' location on the ceiling do pose a significant inefficiency in the heating of the workshop.

There are also faults in buildings such as the Dylan Thomas centre. This building was described as having a particularly old heating systems which in connection to its grade 2 listed building status means that improving and retrofitting the buildings is considerably harder as permission is needed before any work can be carried out as per The Planning (Listed Buildings and Conservation Areas) Act 1990 (UK Government, 2025).



Figure 2 Image of the CWIC workshop heating system (Burgess, 2026)

3.3. Staff Discussions

During discussions with a number of staff members across all buildings audited, a number of staff claimed that they were aware of environmental awareness training being available to them through the universities training portal. However, many of these staff members said that it was not mandatory and that they had not completed the online training. Many staff also felt that the university didn't push them to use environmental practices and independently worked towards being more sustainable themselves. An example of this is a staff member who discussed how one of the most common waste their department produced was saw dust. The universities guidance was to dispose of this in general waste. This staff member alternatively donated it for animal bedding and other secondary uses rather than sending it to landfill.

4. Root Cause Analysis

In order to fix faults found within an organisation, it is important to figure out the root causes of these problems. This can be done by conducting a root cause analysis. This process looks at the symptoms of problems within an organisation and working out the cause of these problems. This is useful as rather than fixing the symptoms of a problem, the key reason can be identified and resolved. This key issue could be linked into an element of the EMS to find out how to continually improve during the PDCA process.

In order to diagnose some of the issues flagged within the audit, the 5 whys method can be used to assess the root cause. This process involves identifying the issue, then determining possible causes and repeating the process until the root cause has been identified.

This is an example of the 5 whys method being utilised for the lack of up to date DEC certificates (Figure 3).



Figure 3 Root cause analysis for lack of DEC's

5. Current EMS Process

5.1. Aspect Identification and Impact Assessment

The process of identifying aspects is outlined in document 4 of the EMS (UWTSD, 2025e). The document discusses how aspects are identified over a range of activities such as teaching, learning, research and general office activities. This responsibility is assigned to the environmental management representative (EMR) who is assigned by each of the group's organisations as a representative.

Within the EMS documents is the Register of environmental aspects (UWTSD, 2025d). As previously stated, this lists the universities aspects and their potential impacts on the environment. The UWTSD EMS calculates its aspect significance evaluation scores based on a number of factors such as consequences which is determined by legislation, stakeholder impact and environmental impact. This score is multiplied by the likelihood score which is calculated through the frequency of the occurrence and the control of the aspect (Figure 4)

Aspects evaluation calculation is based upon consequence and likelihood of aspect environmental interaction.	
Consequence graded on 3 facets;	
· Applicable legislation – Score; (1- not covered) (3- applies) · Stakeholders – Score; (1- none) (2- limited) (3- some) (4 – considerable) · Environmental Impact – Score; (1- insignificant) (2- minor) (3- moderate) (4- major) Environmental Impact can be both positive and negative	
UWTSD Group Definition of;	
Insignificant;	
Minor;	
Moderate;	
Major;	
Likelihood graded on 2 facets;	
· Frequency of occurrence – Score; (1- unlikely) (2- annually) (3- monthly) (4- weekly) (5- Daily) · Control of aspect – Score; (1- effective) (2- moderate) (3- limited) (4- none)	
Consequence total x Likelihood total = Significance Evaluation Score	
In determining the significance of an aspect, the following bands apply:	
Score	Ranking
50>	High Significance
25-50	Medium Significance
<25	Low Significance
Value is based upon professional judgement	

Figure 4 UWTSDs formula for calculating the aspects significance evaluation score (UWTSD, 2025d)

According to ISO14001, when identifying aspects, an organisation needs a system of determining its aspects and their impacts on the environment (Verbanac, 2017). While there is a system for identifying aspects and quantifying its significance, it only quantifies damaging or insignificant impacts.

An example of an alternative method of identifying and quantifying aspects and impacts is the University of Bristol's (UoB) EMS. In UoB's EMS, aspect significance scores are calculated in a similar way to UWTSD but include negative scores indicating a positive

impact (Appendix 1). This allows for any aspects with positive impacts such as stake holder interest and environmental impacts to be better represented in the final scores (Haywood, 2025a). This means an overall better representation of how these aspects are having an impact on the environment as well as the organisation as a whole.

5.2. Leadership and Resourcing

In order for an EMS to be successful, it needs the backing of the senior leadership team. In ISO14001, it states how upper management should ultimately be responsible for the EMS' implementation and well as the up keep of the system (Croner, 2025). This means that upper management are responsible for providing resources such as funding, personnel as well as encouraging staff to work towards achieving the EMS goals.

It is stated in the UWTSD EMS manual (UWTSD, 2025c) that leadership appoint an EMR to take responsibility of the EMS. While the senior leadership team appoint an EMR to promote and manage the EMS, it is ultimately their responsibility to ensure that the EMS is performing as it should. Including making sure that the EMRs have the resources and training to perform their roles efficiently and effectively.

5.3. Training and Communication

It is important that staff within an organisation have the knowledge and training in order to perform their roles effectively while remaining in line with the guidelines set out in the EMS. According to the UWTSD EMS training and awareness document (UWTSD, 2025b), all new staff to the university are to receive induction training where sustainability is supposed to be addressed. According to the internal document this training appears to be standardised and presented to all staff no matter their role. Best practice dictates that training should be given based on job roles that have a specific impact on the environment (Keen, 2021). The UWTSD EMS training and awareness document also mentioned that environmental legislative compliance modules are currently available but are not mandatory as mentioned by several staff members in the audit (3.4).

6. Results and Recommendations

One of the findings of the audit was how a majority of staff expressed their willingness to help towards the universities environmental goals through day to day behaviours such as turning off lights when not in use and recycling. While this was not likely a direct result of university policy and training, it does show that staff and students do have the willing to work towards sustainability goals whether that be for the university or for themselves.

A great example of staff promoting sustainability was the staff member who donated saw dust rather than disposing of it in general waste. This is an example of good practice but is not promoted by the university. The practice of finding secondary uses for waste should be standardised across the university and would be a great way of reducing waste generated by the university.

One major issue that was flagged in the audit is the expired or out of date DEC's at the entrances of many of the buildings. After conducting a root cause analysis, a potential root cause of this issue is leadership and resourcing. According to the roles and responsibilities EMS document (UWTSD, 2025a), it is the EMRs responsibility to monitor legal compliance but the vice chancellor has final responsibility over environmental performance. Whether the reasoning behind the out of date DEC's is due to lack of training or lack of resources, it is the SLTs responsibility to ensure that the EMR is able to fulfil their role effectively and if not, find out the reason why.

As previously discussed, the heating system in many of the buildings such as the DTC and the CWIC workshop is inefficient at best. Based on the explanation by staff for the CWIC workshop, design changes to cut costs seem to be the cause of this inefficient heating system. While costs may have been saved in the construction of the heating system, it makes the whole system almost completely redundant. With the current design, the ceiling is the only part of the room heated which is generally not in use by staff or students. This issue could either be down to poor communication, lack of resources or more likely both.

7. Conclusion

An effective EMS is important in helping large organisations monitor and reduce their environmental impacts. The UWTSD EMS does help the university reduce its environmental impacts but as part of the EMS process, there is always room for improvement.

While ultimately it is the responsibility of SLT, bottom-up approaches are a great way of improving sustainability as long as these efforts have the recognition and backing of higher ups within the organisation. This means recognising the efforts of individuals as well as looking to potentially implement these efforts into standard practice. It is also important that SLT are providing the support, resources and training to the people they appoint to maintain the EMS.

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9. Appendix

Consequence			
A	Environmental legislation and corporate Policy	Is there any legislation affecting the aspect?	Score
		The aspect is covered by legislation & Policy	3
		The aspect is covered by legislation	2
		The aspect is covered by Policy	1
		The aspect is not covered by legislation or Policy	0
B	Stakeholder concern / interest	What stakeholder concern or interest does the stakeholder raise	Score
		The aspect raises considerable global, national and local interest or would have serious detrimental effect on the reputation of the University	3
		The aspect raises some interest and may have some detrimental effect on the reputation of the University	1
		The aspect raises no interest and would have no effect on the company's reputation	0
		The aspect raises some interest and may have some positive effect on the reputation of the company	-1
		The aspect raises global, national and local interest or would have a significant positive effect on the reputation of the company	-3
C	Environmental Impact	What is the environmental impact of this aspect?	Score
		The aspect has a major detrimental environmental impact on the environment or a scarce, non-renewable resource. Long term/irreversible impact.	3
		The aspect has a moderate detrimental environmental impact on the environment or a scarce, non-renewable resource. Impact not reversible within a year.	2
		The aspect has a minor detrimental environment impact or impact on scarce, non-renewable resource. Impact reversible within a month to a year.	1
		The aspect has no known environmental impact	0
		The aspect has a minor positive environment impact or impact on scarce, non-renewable resource.	-1
		The aspect has a moderate positive environmental impact on the environment or a scarce, non-renewable resource	-2
		The aspect has a major positive environmental impact on the environment or a scarce, non-renewable resource	-3
D	Scale of aspect	What is the scale of the aspect?	Score
		The negative aspect occurs in high or large quantities	3
		The negative aspect occurs in medium quantities	2
		The negative aspect occurs in low or small quantities	1
		The positive aspect occurs in low or small quantities	-1
		The positive aspect occurs in medium quantities	-2
		The positive aspect occurs in high or large quantities	-3
Likelihood			
Z	Frequency	How frequently does the aspect occur?	Score
		The aspect occurs on a daily basis	5
		The aspect occurs on a weekly basis	4
		The aspect occurs on a monthly basis	3
		The aspect occurs on an annual basis	2
		The aspect is unlikely to occur	1

Appendix 1 UoBs Aspects and impacts consequence calculation
(Haywood, 2025a)