Global Energy Management System Implementation: Case Study

Republic of Ireland

Allied Irish Bank

Total demonstrated energy savings of $1.5m since 2014, and 21% reduction in energy consumption.

Allied Irish Bank Headquarters, Bank Centre, Ballsbridge, Dublin.

Business Case for Energy Management

Company Profile: AIB is a financial services group operating predominantly in the Republic of Ireland and the UK. It provides a range of services to personal, business and corporate customers and has leading market shares in banking products in the Republic of Ireland. Following its successful re-building since the financial crash AIB is now seeking to recover and build its social license to operate. It is committed to engaging, listening, understanding and responding to its stakeholders, incorporating the key economic and social issues that matter into its business strategy in a way that adds value, both to its business and to society.

EnMS Drivers: AIB has made significant progress in its ambition to be leader in sustainability with several notable accomplishments. The implementation of an organisation-wide EnMS certified to ISO50001 (AIB will be the first financial services organisation to achieve certification across its international portfolio – this is currently awaiting approval - Feb 18) has been fundamental to much of this. Successes to date include recognition for sustainability such as a Carbon Disclosure

"We want AIB to become a leader in sustainability, both in thought and practice"

- Bernard Byrne (Chief Executive Officer, AIB)

Case Study Snapshot	
Industry	Financial Services
Product/Service	Finance
Locations	**Ireland – 5 Sites:** AIB Bank Centre (HQ) and 4 Head Offices
Energy Management System	ISO 50001
Energy Performance Improvement Period	2014 – 2017
Energy Performance Improvement (%) over improvement period	21 %
Total energy cost savings over improvement period	US $1,491,247
Cost to implement EnMS	€182,000
Payback period (years) on EnMS implementation	0.6 years
Total Energy Savings over improvement period	167,963 GJ
Total CO_2-e emission reduction over improvement period	9,015 tCO_2-e

Project (CDP) Grade A in 2017 for climate change mitigation (among top 114 companies in the world) along with a number of energy environmental awards.

AIB currently operate a €100m fund to support energy efficiency and energy saving measures to Irish SME's (Small to Medium Enterprises) in conjunction with SEAI (Sustainable Energy Authority of Ireland). Establishing internal skills and leadership in this sector has helped AIB to develop this business.

As a majority state owned organisation AIB is also obliged to fulfil its obligations as set out in Irelands NEEAP (National Energy Efficiency Action Plan). One of the requirements is a 33% improvement in energy performance from a 2009 baseline by 2020. Currently AIB are 21.8% better than the baseline and 1% better than target.

Energy Program & Reduction Approach: AIB started out on its journey towards best practice energy management in 2012 when, as a majority state owned body, it was mandated to improve its energy performance by 33% compared to 2009 levels. In 2013 it embarked upon a coordinated energy reduction approach with ISO50001 as the key enabler to achieving its targets. From the outset, a plan was developed to implement a phased roll out of ISO50001 across the group, commencing with the largest site (AIB Bank Centre), moving to its head offices and finally the remaining branches across UK and Republic of Ireland. The groupwide EnMS has been fully audited and is awaiting final approval in February 2018.

A phased implementation proved to be an effective approach. Focusing on the largest site at the outset offered several benefits including several good opportunities for energy reduction projects to build early momentum in the process. As the location of many of the energy team (senior management, engineering, projects and management staff) it was easier to coordinate and set up the management system. This initial phase was used to develop internal knowledge and understanding of ISO50001 as well as to put in place the core structure before expanding across the full organisation.

Business Benefits Achieved

Since the implementation of a structured EnMS, AIB has achieved significant savings across its organisation - reducing energy consumption by 167,963 GJ (21% saving) and CO_2 Emissions by 9,015 tCO_2 versus the baseline year 2013. This has resulted in energy cost savings of US $ 1,491,247.

The ISO50001 program has made a considerable contribution towards achieving its EU mandated 2020 energy efficiency improvement targets. As of 2016 data, AIB are exceeding their performance target and have achieved 21.8% energy efficiency improvement versus the baseline year 2009. AIB are committed to continuing with this success making significant energy savings and emissions reductions from several ongoing energy projects.

The structured and systematic approach to energy management and performance measurement has provided valuable insight and expertise towards AIB's provision of finance to the renewable and energy efficiency sectors – enhancing both technical and commercial skills of AIB staff. This has been a key objective of the EnMS from the outset.

ISO50001 has achieved several non-financial benefits. Among them is the level of awareness and engagement that it has generated across a large organisation of greater than 10,000 staff. All staff partake in energy awareness and many have contributed towards improvements and opportunities.

The ISO50001 management review process has been instrumental in raising the profile of energy management directly with senior staff. The CEO, who comes from an energy background, has directly supported and encouraged the process. This has been a key enabler in the success of the system.

In general, the success of the EnMS and other sustainability achievements have provided positive news stories and are a key contributor to AIB's goal to be a "Sustainable Bank".

EnMS Development and Implementation

AIB's Energy team was formed in 2013 and incorporated members from both an energy and environmental background along with key staff members who had an ability to influence energy use and an enthusiasm to deliver results. This was key to the success which followed - a senior management representative with a strong personal and commercial interest along with a motivated and engaged team.

This EnMS strategy was also developed in 2013 with the objective of improving energy efficiency and performance improvement across the organisation. The diagram shown in Figure outlines the timeline to develop and implement the EnMS:

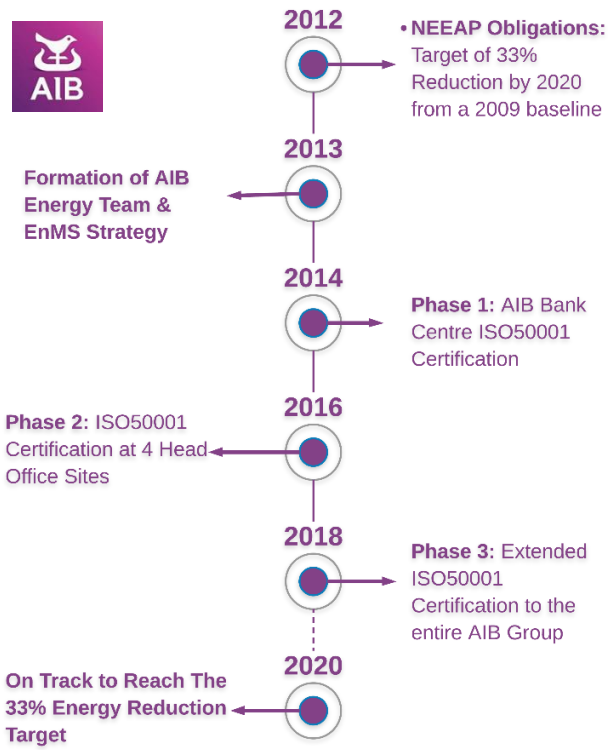

Figure 1: AIB EnMS Timeline

In Oct 2014, AIB received ISO50001 certification for AIB Bank Centre - its largest site and headquarters. This was further expanded in June 2016 to four of the largest head offices and subsequently to the remainder of AIB portfolio in February 2018 - across all branches in the UK & Ireland (this phase is currently awaiting approval from the certification body)

Energy Review and Planning: On committing to clear targets and objectives for the forthcoming 6 years AIB set about implementing the first phase of the EnMS. This involved a detailed energy review of the largest AIB location – Bank Centre (approx. 40% of all energy use). This study identified opportunities to deliver very significant savings at an early stage and generate excellent momentum and support for the process. One of the most successful projects was the buy-out and optimization of the onsite tri-generation system. A detailed analysis and review of its operating regime along with control parameters identified an opportunity to significantly reduce energy use and cost.

The Energy Review process also identified many opportunities associated with the existing HVAC and control systems which offered further savings at low capital cost. Many of these projects not only delivered excellent energy and cost reductions but also improved building comfort levels, reduced maintenance downtime and labor costs as well as enhancing user knowledge and understanding of how such systems operate. A key tenet of the approach from the outset has been to optimize existing systems first, only investing in large capital items where a clear benefit will be delivered within a well understood and controlled system. By adopting a clearly defined measurement and verification process, project approval for investment in such projects has been more forthcoming.

Cost Benefit Analysis: The savings associated with the EnMS have been achieved in 3 principal areas:

1. Optimization Projects
2. Awareness & Education
3. Operational Control

The primary costs towards implementing this EnMS and working towards ISO50001 certification, included the following:

- EnMS development & implementation costs – internal and external resources.
- EnMS metering and monitoring equipment.
- Energy improvement projects (e.g. CHP Optimizations, lighting retrofit upgrades, HVAC

Controls Optimization Projects, boiler upgrade projects, transport fuel efficiency improvements).

- EnMS certification and audit fees.

In total, AIB has spent approx. $182,000 per annum to develop and implement this EnMS and has achieved savings to date of $1,491,247 (approximately $373,000 per annum), resulting in a simple payback period of **0.6 years**.

Determining Energy Performance Improvement: AIB utilize several methods to determine energy performance improvement and to validate results. These include its obligations under the NEEAP where it reports for the entire organisation on an annual basis. This data is submitted through the '*Public Sector Monitoring and Reporting*' web-portal, which is verified by SEAI to establish the organization's progress towards its 2020 target of 33% energy performance improvement. This is based on an organisation energy metric which is measured using the following variables and published annually:

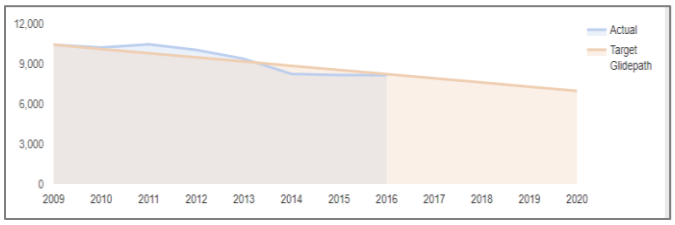

Figure 2: AIB NEEAP Energy Performance - 2009 to Present

It also reports directly for the sites within the EnMS boundary at 2 distinct levels. The top level which reflects the results outlined in this application are calculated from total primary energy consumption per site adjusted for weather and useful floor area.

The second level of performance indicators provide a deeper insight to energy use and are reported at weekly/monthly intervals. Depending on the site complexity or scale these are, in many cases, based on regression models at the SEU level. This level of validation and oversight provides AIB with strong confidence in its reporting and performance metrics.

Due to the phased implementation a baseline of 2013 was used for Bank Centre and 2014 for the head offices.

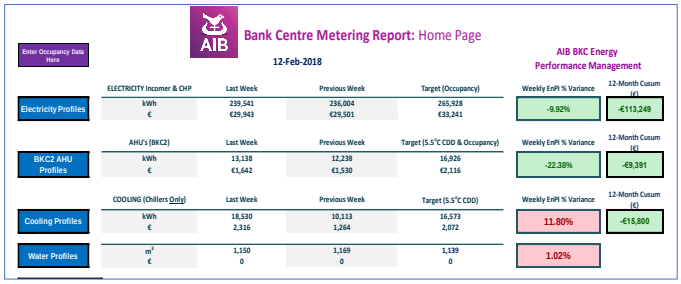

Figure 3: AIB Bank Centre Weekly Metering Report

AIB carries out regular internal audits to validate the effectiveness of the management system and energy performance. As part of an integrated system AIB is able use competent auditors from other areas such as ISO14001 to assist with this process as well as engaging qualified external support to ensure a robust and effective management system.

Steps taken to maintain operational control: AIB places a strong emphasis on operational control, training and improving the skillset of staff who are key influencers in terms of energy use. This is achieved in a variety of ways. All projects which incorporate new, upgraded or optimized systems require a full Functional Design Specification which clearly outlines how the system operates in an energy efficient manner. This is a document which is accessible to all staff who influence the associated system to understand how it should operate.

Site Acceptance test are carried out as part of the commissioning process to verify that design is completed as outlined in the Functional Design Specification. These tests are then applied on a regular basis to ensure that the system continues to operate as designed and efficiently.

These tests are further verified by the measurement and verification plan. AIB have an extensive sub-metering infrastructure but also use portable thermal and electrical meters for key projects.

AIB deliver Toolbox talks at regular intervals throughout the organisation to impart key information and changes to staff. Toolbox training themes include "Energy Efficient Design at AIB", "Motor Management Planning" and "Energy Efficient Maintenance and Control".

Professional Expertise, Training, and Communications: Training, Communication and professional expertise are key to success of the EnMS at AIB

- AIB have developed an in-house, online training and engagement module which is delivered organisation-wide. The module focuses on informing staff of AIB's sustainability goals and performance, how to contribute and other ongoing initiatives.
- AIB regularly hosts energy awareness days for staff and customers to promote and support businesses and small companies with a sustainable agenda.
- AIB conduct Toolbox talks on a regular basis to communicate key messages and training to relevant staff.
- Key staff engage in ongoing training such as EnMS internal auditing, technical training and Certified Energy Manager (AEE).
- AIB has participated in national and international events to promote its sustainability successes e.g. CDP, Green Awards, Pakman Awards.

Tools & Resources: Metering, Monitoring & Reporting: AIB has expanded its sub-metering infrastructure across many of its largest energy consuming locations. This data has been used to develop weekly/monthly reports for key managers. These reports range from regression-based modelling of Significant Energy Users to area-based energy intensity models depending on the building complexity or size. This information provides AIB with excellent monitoring and exception reporting along with an opportunity to react quickly to changes from expected performance.

To improve knowledge and awareness relating to energy management and sustainability AIB has developed an awareness program for all staff. This is located on AIB's intranet and is designed to inform staff of AIB's commitments and ambitions and to assist them in contributing both at work and at home.

AIB has recently integrated its ISO50001 and ISO14001 management systems. This has resulted in significantly reduced documentation and administration resources as well as improved technical and system competency of key staff.

Lessons Learned

Management Commitment: The most important factor in implementing a successful energy management system is the support and commitment of senior management. AIB Group is firmly committed to a sustainable agenda.

Data Management & Reporting: As the EnMS extended across the organisation, the importance of a robust system for data management increased. AIB developed a top down reporting system whereby the energy and environmental manager can view performance from a Group level right down to individual locations and SEU's in some cases. A strong data management and reporting system is key to managing and maintaining performance improvement.

Training and Awareness: As outlined above the ongoing development of training, awareness and competency across all staff has been key to the success of AIB's EnMS. From the online training platform and web page to regular targeted toolbox talks to awareness days for staff and suppliers, AIB has constantly sought to engage and inform its staff on energy and sustainability matters. This has helped to embed a culture of best practice across the organisation.

Figure 4: AIB Staff Energy Awareness Training Course

Building Momentum: Some early "wins" and excellent opportunities to reduce cost and consumption provided critical support and momentum at the development stage of the EnMS. One such project was the buyout and optimization of the tri-generation system which

contributed very significant cost and energy savings. Commercially strong projects were also identified early in the process which also added significantly to the overall credibility of the approach.

Communication challenges: Due to the scale and geographical spread of the system boundary, communication of important information was central to the success of the EnMS. This was achieved via the AIB sustainability web page as well as the online awareness training and toolbox talks.

Figure 5: AIB Staff Environmental Awareness Program

External Expertise: While AIB continuously seeks to build upon the education and competency of its own staff, it also understands the benefits of engaging experts in key areas where complex or specialized solutions are required. One such area is building controls where optimization of existing HVAC systems required a strong technical competence as well as a clear focus on the end goal of the project i.e. delivering and verifying energy performance improvement.

Keys to Success

- Strong support, commitment and encouragement from senior management.
- Promote staff awareness and engage employees at all levels within the organisation.
- Integration of knowledge and approach into wider business objectives thereby improving investment decisions and embedding the process.
- Improvement Opportunities: Focus on knowledge development and systems optimization to create commercially strong and sustainable opportunities.
- Promote achievements - internally and externally