

# ISO 50001 Energy Management System Case Study

2020

Taiwan

## CTBC Holding

*Achieving environmental sustainability and promoting a "Green Policy, Green Future" strategy. Taiwan's first financial institution to receive ISO 50001.*



CTBC Holding's purpose-built headquarters, CTBC Financial Park

### Organization Profile & Business Case

CTBC Financial Holding Co., Ltd. (CTBC Holding) was established on May 17, 2002. We are headquartered in Taiwan's capital, Taipei, but our workforce of 27,000 spans the country, region, and globe. Our subsidiaries include banking, insurance, securities, securities investment trusts, venture capital, asset management, security, and administering the national lottery. The banking arm, CTBC Bank, has 152 branches domestically and 115 overseas, making it the most extensive international network of any Taiwanese financial institution.

We believe that ensuring sound corporate governance and fulfilling our responsibility as a good corporate citizen will guide us to create new value for customers, employees, shareholders, and the community. This is how we're reaching our goal of becoming the most trusted financial institution among clients and investors alike.

### Case Study Snapshot

<b>Industry</b>	Financial
<b>Product/Service</b>	Banking, insurance, others
<b>Location</b>	Taiwan
<b>Energy management system</b>	ISO 50001
<b>Energy performance improvement period, in years</b>	Over 7 years
<b>Energy Performance Improvement (%) over improvement period</b>	16%
<b>Total energy cost savings over improvement period</b>	US\$997,361
<b>Cost to implement EnMS</b>	US\$403,510
<b>Total Energy Savings over improvement period</b>	35,905 GJ
<b>Total CO<sub>2</sub>-e emission reduction over improvement period</b>	5,316 metric tons

**Integration of ISO systems with clearer goals** – In addition to proactively introducing ISO 50001, CTBC Bank began introducing the ISO 14001 environmental management system and ISO 14064-1 greenhouse gas (GHG) inventory in 2015. These three ISO systems were integrated and officers were appointed to help drive environmental and energy management and to improve the company's internal environment and energy performance every year.

*“The value of an enterprise lies not in its profitability but in its contribution to society.”*

—Dr. Jeffrey Koo Sr., CTBC Holding founder

**Business Benefits**

Facilitated by the experience of CTBC Bank, other branches and subsidiaries obtained ISO 50001, ISO 14001, and ISO 14064-1 certification between 2012 and 2019 (Figure 1). In this time, we recorded energy performance improvement of 16% for a carbon reduction benefit of 5,316 metric tons, the equivalent of the monthly electricity consumption of 10,000 households in Taiwan.



Figure 1: Driving performance through ISO 50001

**Environmental sustainability policy implementation** – We acknowledge our responsibilities as a corporate citizen. Our efforts in this area start with reducing our energy use and carbon footprint by developing green products and strategies and engaging in sustainability-centered initiatives with both customers and employees.

**Results** – All 152 of CTBC Bank’s domestic branches were required to install timer devices for their advertising signage and to adjust the on and off times of the signage based on summer and winter daylight hours. At our headquarters, all lighting has been replaced with LED lamps, which number approximately 16,000 and can be controlled remotely; furthermore, when an employee leaves their seat or is working overtime, individual lights can be switched on or off, and the lights can be turned off for 1 hour during the lunch break. Our headquarters has cut its annual electricity usage and carbon emissions by 11,759 kWh and 6.21 metric tons, respectively.

For our air-conditioning equipment, we perform annual efficiency testing and replace outdated equipment; in addition, the operation time of the water cooled chiller systems of all our Taiwan bank branches was adjusted from 7 a.m.–7 p.m. to 8 a.m.–6 p.m. From 2018 to 2019, our bank branches achieved an annual power use reduction of 227,970 kWh, thereby cutting emissions by 1,215 metric tons of CO<sub>2</sub> equivalent per year.

**Achievement of energy goals** – We promote energy integration projects and targets through three-year plans. The 6% cut in power use we targeted in the first phase (2015–2017) was successfully achieved, with our reduction of 1.2 million kWh exceeding the goal of 780,000 kWh. For the next phase (2018–2020), we have set a target of reducing total electricity consumption by 2% per year for, again, a total of 6%, translating into a cut of 1.72 million kWh and more than 952 tons of GHG emissions over the three years.

**Excellent environmental benefits** – Our headquarters occupies an area of approximately 30,700 square meters. It is the largest Diamond-grade Green Building Label-awarded building of any company in Taiwan’s financial industry. In addition, in 2019, it was awarded LEED O+M v4.1 Platinum Certification from the American Institute of Architects, the world’s leading authority on green buildings, becoming Taiwan’s first recipient of LEED v4.1 recognition (Figure 2).



Figure 2: LEED O+M v4.1 Platinum Certificate

**Solar power generation and green power purchasing** – Because electricity is the main source of our energy and GHG emissions, CTBC Financial Park is equipped with two sets of solar power generation equipment, which can generate 234,274 kWh of electricity annually for use around the park, delivering average yearly cost savings of US\$22,600 since 2015. We have also supported the Taiwan government’s green energy policy by purchasing 100,000 kWh of green electricity every year since 2016.

**Plan**

**Certification expansion experience** – Even before introducing the ISO 50001 energy management system, CTBC Bank was continually implementing energy saving measures. In doing so, we discovered that setting a

more reasonable contract capacity with the national power supplier could more effectively control and reduce our electricity costs. Therefore, all bank branches across Taiwan now observe, review, and adjust their contractual capacities.

After a comprehensive review of the contractual capacities set by all branches, electricity consumption was adjusted, waste was minimized, and overcharges were added, resulting in the significant reduction of the electricity costs of our branches nationwide. This process is repeated annually. Further seeking international energy management methods, we found that the Taiwan government was actively encouraging enterprises to implement the systems needed for ISO 50001 certification. These span three main areas, namely management, systems, and technology, in order to identify opportunities and practices for improving energy use. This, combined with the company's energy management system, facilitates the regular review of energy usage and the reduction of energy waste.

CTBC Bank first introduced ISO 50001 energy management systems in 2012, after which we rolled out implementation across all bank branches within three years. This started with one demonstration site, namely our Taipei headquarters, where the systems were launched in three stages. We then introduced the systems at all our remaining bank branches nationwide and at our seven other subsidiaries. This formally kicked off the bank's environmentally sustainable operations and its implementation of energy-saving measures, which were expanded to more branches every year. It is expected that in 2020, CTBC Holding and its subsidiaries will all have upgraded to ISO 50001:2018.

Indeed, CTBC Bank's energy-saving achievements have lifted the standards of the entire CTBC Holding group. In 2018, we set CTBC Bank as a benchmark for the whole group and began encouraging other subsidiaries to gradually introduce the ISO/CNS 50001 energy management system (Figure 3), jointly promote independent energy management and energy conservation goals, and have all their employees work together to ease energy use and reduce carbon emissions.

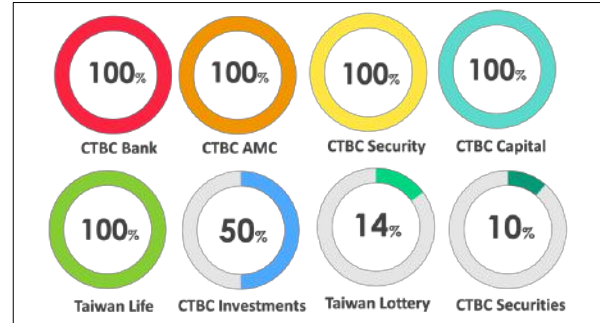


Figure 3: Percentage of CTBC Holding subsidiaries with ISO 50001 certification

**Energy policy and goal setting** – To maintain the stable operation of the energy management system, CTBC Bank has formulated environmental sustainability policies and procedures under our “Green Policy, Green Future” strategy (Figure 4). In accordance with it, we will strengthen implementation and maintenance, ensure regular reviews, and bolster communication between internal and external stakeholders, with a scope of technical feasibility, financial and operational aspects, and operational needs.

During these processes, improvements such as equipment removal, replacement, engineering control, labeling and warning, management control, and hardware are given priority. Through institutional implementation and progress report meetings, CTBC Bank has achieved the yearly goals that make up its three-year plans. Looking ahead, we are confident we can continue to reduce our electricity use by at least 2% each year, for a total 10% reduction from 2020 to 2025.



Figure 4: Our environmental sustainability policies

*“In line with the United Nations’ Sustainable Development Goals, Principles for Responsible Investment, and Principles for Sustainable Insurance, we have launched financial products and services specially tailored to protect the environment and the community. We also fulfill our CSR by investing in and organizing various public welfare activities.”*

—Wen-Long Yen, CTBC Holding Chairman

**Energy review** – Each branch and subsidiary conducts an inventory of the energy usage of various equipment, examining, for example, equipment type, power consumption, and operating time. The energy consumption value, age, and operation of the equipment are then weighted and, if the power consumption of equipment is found to represent 50% or more of the equipment’s total energy consumption value, it is classified as major energy-using equipment. We hold regular management review meetings, at which resource proposals are made by all our locations and are prioritized by the headquarters allocates them based on the available budget funds. The main investments are made in bases with a relatively large proportion of energy consumption.

**Action plan formulation** – Through a review of our energy management system, we identified our air-conditioning and lighting systems as our most energy-intensive equipment. The review determined that we should establish an air-conditioning equipment management mechanism, perform regular reviews of the efficiency of water cooled chillers, and gradually replace those with overly high energy consumption. Furthermore, our headquarters features advanced chilled-beam and ice storage systems that reduce energy consumption and shift peak demand while our refrigerant management procedures further reduce GHG emissions. We also committed to phasing out inefficient lighting with low energy consumption LEDs and adjusting the hours in which lighting is turned on.

We also engaged a domestic energy diagnostics technology company to explore potential energy-saving

measures, such as optimizing the operational efficiency of energy-consuming equipment, developing energy management action plans suitable for each bank branch, and regularly tracking energy performance.

### Do, Check, Act

**Establishment of a sustainability group** – To ensure the stable, long-term operation of our energy management system, in 2017 we established a Corporate Sustainability Committee, which is entirely comprised of independent directors and is chaired by the president of CTBC Holding. The committee has established an Environmental Sustainability Group, the management representatives of which hold management meetings and devise environmental and energy targets aimed at improving our environmental and energy performance every quarter (See Figure 5). We adopted a gradual implementation method. Some measures are first tried at our headquarters while others are trialed at branches. Other bases look at experiences elsewhere; after a certain practice is determined to be feasible, it is implemented across other branches and even other CTBC Holding subsidiaries.



Figure 5: Members of the Corporate Sustainability Committee

**Goal tracking and results review** – Each branch’s energy reductions are reviewed at Environmental Sustainability Group meetings and data such as electricity consumption is tracked monthly to ensure that our annual goals are achieved. The air-conditioning infrastructure at our headquarters includes an ice storage system; in summer, when consumption and prices peak, we operate it to freeze ice during off-peak hours (i.e., night), with the ice melted the next day. This both eases the burden on the grid during the day and reduces our own power bills. All branches also now switch off their air-conditioning at least half an hour before the end of the business, after we found that the

resulting temperatures were still cool enough for the branch staff to work in a comfortably. Furthermore, even areas that see relatively less usage, such as warehouses and walkways, are having their lighting gradually replaced with induction lighting.

**Action plan implementation** – Each department draws up appropriate energy management action plans based on its sites’ needs and subsequently documents the implementation of these plans. Finally, the heads of relevant departments hold interim meetings to determine whether the energy goals have been achieved. The implementation at this stage involves actions such as the following:

- cleaning air-conditioning equipment, filters, and cooling towers to improve air-conditioning efficiency;
- replacing old air-conditioning mainframes and lighting equipment (in 2019, 46 action plans were implemented, saving 720,000 kWh and US\$70,000);
- turning off the lights in our data center and using infrared surveillance to allow 1,021 lights to be switched off at night, saving approximately 276,455 kWh per year, or US\$26,000; and
- turning off all branches’ air conditioners 0.5–1 hour before the close of business, saving about US\$131,000 per year.

**Establish baselines and performance indicators** – The energy performance indicators of each building and branch are presented as energy use intensity, namely the rate of power consumption per unit floor area (kWh/m<sup>2</sup>). The data center uses power usage effectiveness as an energy performance indicator and presents it as the energy consumption (kW) rate of information equipment for the data center’s total power consumption (kW). Regression analysis is used to determine whether dynamic factors other than air temperature, employee days at work, and EUI are relevant. If no other significant factors are identified, the historical data comparison method is adopted to establish an energy usage baseline. The baseline and reporting period utilize three-year cycles. In addition, monthly surveys of changes in energy performance indicators and energy baselines are conducted; when a significant difference or deviation exists between the monthly energy performance indicators and the

changes in the energy baseline, with a variance analysis of 10% or more, an investigation is conducted and reported to the management representative and appropriate corrective measures are developed.

**Ensuring continual improvement in energy performance** – Annually since the introduction of the energy management system in 2012, air-conditioning equipment has been found to be the main energy-consuming equipment. Every year, we have invited a third-party verification unit, SGS, to measure the efficiency of any air-conditioning equipment that is more than 10 years; based on these measurements, we replace the air-conditioning equipment with the least efficient performance. Furthermore, we consolidate the monthly energy consumption data measured by the electricity meters at each bank branch and compare it with that from the previous year in order to assess the improvement in energy performance. In addition, in consideration of its high number of branches, the bank holds power-saving competitions to encourage branches to implement power-saving practices, and these contests have effectively improved the branches’ energy performance.

**Supervision of measurement tools** – At our headquarters, we have established a smart monitoring system to manage the running time and energy usage of various equipment (Figure 6). This centralized system can resolve abnormal energy use circumstances as they occur in real time. Every floor of our headquarters has an integrated meter, which we use together to determine monthly power consumption.

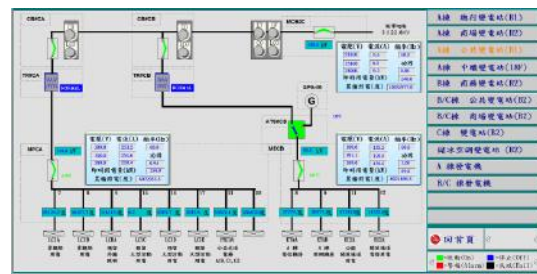


Figure 6: The energy central monitoring system in the building of the CTBC Holding’s headquarters

**Ability training and communication** – Every year, we provide our existing employees with energy

conservation training for facilities such as lighting and air-conditioning, conducting the training an average of 11,089 person-times annually. For new employees, courses on the environment and energy efficiency are held to strengthen the enthusiasm of new employees regarding energy and management, with an average of 1,525 person-times per year. In addition, if employees or contractors have suggestions concerning environment and energy conservation improvement or advocacy, they can share them directly via the feedback portal on our website.

**Green procurement** – Our green procurement for 2012–2018 exceeded US\$56 million (Figure 7). Our procurement practices give priority to environmentally friendly products and technologies that conform to environmental protection labels, energy labels, or trusted organization.

Item scope	2018	2017	2016	2015	2014	2013	2012
Scope 1	399	599	581	579	564	625	214
Scope 3	453	85	107	326	326	694	124
<b>Total</b>	<b>852</b>	<b>684</b>	<b>688</b>	<b>905</b>	<b>890</b>	<b>1,320</b>	<b>338</b>

Unit: million US\$  
 Note 1: Scope 1 comprises products with ecolabels issued domestically or overseas.  
 Note 2: Scope 3 comprises products with domestic energy-efficiency marks, water-saving marks, green building material marks, and carbon footprint labels as well as sustainable products certified as such by the Financial Supervisory Commission, Programme for the Endorsement of Forest Certification, or other foreign organization.

Figure 7: Green procurement items and amounts

### Transparency

By expanding the scope of our ISO 14001, ISO 50001, and ISO 14064-1 certification every year, we are ensuring that the management practices at every point in our operations meet international standards. We also adopt specific practices such as customer negotiation, supplier management, education and publicity campaigns, and the implementation of environmental protection programs—all of which we detail on our

holding company, bank, and IR websites as well as in our annual report and CSR report. Our public engagement efforts and recognition for our sustainability strategy have included:

- Earth Hour participant since 2010;
- Dow Jones Sustainability Emerging Markets Index constituent stock for four consecutive years;
- 2017 Asia Responsible Enterprise Award in Green Leadership;
- Energy Saving Leadership Silver Award from Taiwan’s Ministry of Economic Affairs; and
- Commendation for Excellent Performance in Private Enterprise Green Procurement from the Environmental Protection Administration for 10 consecutive years.

### Lessons Learned

- All our subsidiaries have received ISO 50001 certification—but getting here was challenging. This was partly due to our numerous locations dispersed throughout Taiwan, which makes communication difficult and introduces more room for error in data collection and transmission. However, guided by our “We are family” brand spirit, we sought, identified, and implemented measures to address these problems.
- It’s a challenge to which we are still devising new approaches. Indeed, we are currently developing an intelligent system that can receive real-time energy consumption data from integrated meters throughout our headquarters, making for vastly more efficient and accurate collection, review, and usage of this data.

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit [www.cleanenergyministerial.org/energymanagement](http://www.cleanenergyministerial.org/energymanagement).

