ISO 50001 Energy Management System
Case Study

2021 US, UK, Netherlands, Singapore

Iron Mountain Data Centers - ISO 50001

The first data center organization to achieve ISO 50001. Leading the industry on compliance and sustainability.

Iron Mountain Data Centers logo

Organization Profile & Business Case

Iron Mountain Data Centers (IMDC) is a division of Iron Mountain Inc, an innovative storage and information management services company , based in Boston, MA. As a leading global data center provider, IMDC has an overarching commitment to operating business in the most sustainable way possible in order to preserve our environment and care for the planet. This pledge is driven by a long list of public commitments around climate, environment, and social responsibility.

"As the first data center company to have enterprise-wide, global ISO 50001 certification, Iron Mountain Data Centers is proud to be leading the way to a more sustainable planet. With ISO 50001 we are able to utilize energy consumption in a responsible, meaningful, tracked and measurable way. "
—Jim Henry | Senior Manager, Global Compliance

Case Study Snapshot	
Industry	Data Centers
Product/Service	Colocation Data Center Services
Location	Boston, MA
Energy management system	ISO 50001
Energy performance improvement period, in years	5
Energy Performance Improvement (%) over improvement period	6% average
Total energy cost savings over improvement period	N/A - PUE does not have recognized quantifiable monetary measurements
Cost to implement EnMS	~$10,000 (indirect)
Total Energy Savings over improvement period	6%, in PUE across all global facilities
Total CO_2-e emission reduction over improvement period	100% - IMDC are powered by 100% renewable energy

In the last several years Iron Mountain Data Centers has successfully achieved multiple initiatives supporting our greening the grid strategy.

- In 2019 Iron Mountain Data Centers launched Green Power Pass, providing 100% renewable power to all our customers, allowing them to achieve their own sustainability goals.
- A new 7.2 MW-rated solar installation at Iron Mountain's data center in Edison, New Jersey generated more than 9 Million KW/hrs in 2020.

- Net-zero waste strategy: improved reporting of materials use, water consumption, and waste and recycling implemented.
- Joined The Climate Pledge alongside other like minded businesses, targeting net zero carbon by 2040.

Figure 1: IMDC 7.2 MW solar installation, Edson, NJ

Due to the energy intensive nature of data centers, and the start of the US Department of Energy's Better Buildings Data Center Challenge which IMDC signed on for, IMDC had the forethought to adopt the ISO 50001 standard for all sites in our portfolio in order to drive continual improvement of energy performance, as well as rigor, and third party verification of energy data. Since 2017, IMDC has been ISO 50001 certified across our entire footprint, making us the only globally certified data center provider with ISO 50001. Through multiple greenfield builds and acquisitions the adoption of ISO 50001 as a management system has allowed IMDC to guide the business toward a more responsible and sustainable future for our shareholders, our customers and our planet.

Business Benefits

Since implementing ISO 50001 in 2017, IMDC has transformed the way in which we do business using various ISO management systems as guidance for continual improvement. More specifically for ISO 50001, it has driven a constant decision making process with continual engagement from top management in order to improve not only energy efficiency, but also data collection methods, metering and monitoring, staff and customer awareness, as well as innovating new solutions for energy efficiency and carbon emission reduction.

Our multi-site approach started from the very beginning, with 3 initial sites being certified against the standard. This number significantly grew over the next 5 year period resulting in the present 14 sites under certification, with more to be added in 2021. Multi-site certifications are challenging, but also have provided many benefits for diverse engagement of teams, cross-organizational and geographical collaboration for projects, greater accountability, as well as a shared portfolio power usage effectiveness (PUE) number that reflects the collective performance of all sites as an Energy Performance Indicator (EnPI). PUE is one of only a handful of ways to truly measure data center efficiency. Originally created by the Green Grid, and specified in ISO 30134-2:2016, PUE aims to measure the relationship, or delta between total facility power use, and the power use of IT equipment (servers etc..) in the computer rooms. The lesser the gap between the two numbers represents an efficient use of overhead power used to cool the data center, and overall, a low PUE.

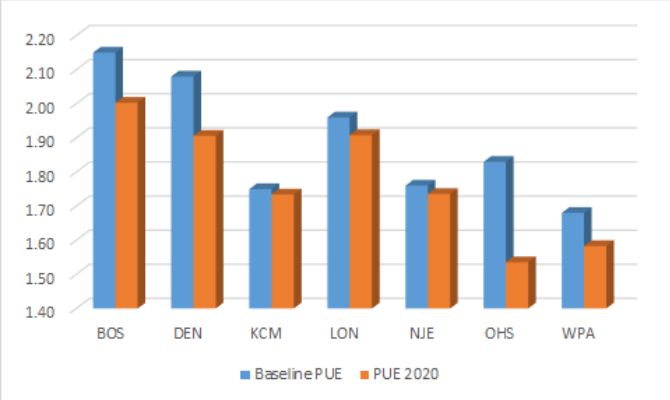

Figure 2: IMDC Energy Performance, 2020 vs Original ISO 50001 Baseline

While measuring energy performance in a data center environment is fairly non-standard, IMDC has set baselines, improved performance over time, and re-baselined in some cases, in order to further drive enhanced improvement. Doing this through acquisition makes things even more challenging. In our experience, standardization of systems, processes, and data collection to get new sites into the management system is a high priority after a new site is acquired. New sites, whether acquired or newly built also (often) come with

other challenges, such as inefficiency, which drives the portfolio score (EnPI) occasionally in the wrong direction, since enterprise PUE is a collective metric derived from the performance of all sites. With all of this considered, IMDC has still continued to improve performance at a large percentage of sites each year, with an average of 6% across all sites since baseline.

IMDC has been very fortunate to reap the benefits of ISO 50001 both internally, and externally. Our initial participation in the U.S Department of Energy's Better Buildings Data Center challenge came with energy efficiency targets and commitments, which in 2019, we achieved, becoming only the 3rd data center in the country to become a D.O.E Better Buildings Goal achiever. Our accolades in energy management and efficiency also extended into 2021 when IMDC was recognized by the Department of Energy, and the Industry, for Market Transformation as a Gold Level Green Lease Leader, which attests to our enablement of green and sustainable practices in a landlord/tenant relationship, driving energy efficiency and renewable energy use. Additionally, utilizing the rigor of the audit and data tracking within ISO 50001, IMDC has developed a revolutionary, first in the industry product which passes our renewable energy allocations through to our customers, also known as Green Power Pass.

Figure 3: Green Power Pass giving renewable energy to all customers, with third party verification.

In an ongoing effort to reinforce IMDC's mission for continual improvement, conformance with the standard, and employee education, IMDC has also developed new hire training on the purpose of both our EnMS and EMS for all new employees. All current employees are also required to complete annual refresher attestations to the Energy, and Environmental Policy. Engagement with our employees is seen as one of the most important aspects of the EnMS, as positive impact is a collective effort of all individuals, not just those who have the potential to impact energy performance.

Lastly, our alignment and certification in ISO 50001 was the impetus for our global certification in 2020 with ISO 14001. Continuing to provide value to our clients, industry, and ultimately the planet, required a wider view at our overall impact which directly correlates to the implementation of our Environmental Management system.

Plan

The planning process of our EnMS is built into the DNA of Iron Mountain Data Centers. This began at the beginning when our top leadership made the choice to deploy an EnMS using the ISO 50001 standard, with the forethought that energy management would be more than just a hot topic, but a requirement in the coming years. The ISO 50001 standard was chosen due to its rigor, consistency, and international recognition. It turns out - this entire decision was a sound one which has enabled IMDC to push ahead of our peers, as well as demonstrate continual improvement and leadership in an industry that emits more carbon per year than the airline industry. Transforming the way we do business into a more sustainable model is a way of life. Now, after running the EnMS through its first stages of maturity, virtually all decisions around new innovations require a significant sustainability assessment, with a large focus on energy use and efficiency. New developments, such as acquisitions, greenfield builds, and expansions are also included in the planning process as our management continually demands improvement in our conformance with compliance standards in order to add value to our industry, community, and planet.

Do, Check, Act

As previously mentioned, management support across the entire company is one of the pillars of what makes our EnMS so effective - the energy committee consists of site-level directors, as well as senior leadership on our executive team. Through not only routine management reviews, but also in ad-hoc sessions on strategy of the organization, we strive to improve our operational efficiency, and continue to solve ways to enable this with our customers as well, helping them with their environmental governance goals. One specific way is by partnering to ensure that our customers understand why configuring a data center in an efficient manner benefits everyone from an energy management, and risk perspective. IMDC has on-site operations personnel that work 24/7/365 to ensure the data center environment is operating at optimal efficiency with the given customer IT load present in the facility.

Of course, none of the management involvement, or continual improvement could be possible without good data, or data at all. Given the unique industry we are in, it's not as simple to just use Energy Usage Intensity (EUI) to measure our success. PUE is the data center measurement of choice that represents the relationship between IT energy used by servers, and the “overhead” energy used to support the entire building. The closer these data points are, the lower PUE you have. So with that said, utilizing energy invoices, as well as metering on our IT infrastructure at all sites is the most important first step when we move a facility into the scope of the EnMS. Aside from measuring efficiency, we also measure other energy sources, such as diesel, and natural gas use (also emissions). We then utilize these data points, and our allocation of renewable energy to present a holistic view to our management and leadership of where we stand against our baseline energy data.

Utilizing the data from our data collection plan, we regularly set targets based on underperforming sites, facilities with improvement projects underway, and other targets set in accordance with programs such as the U.S Department of Energy’s Better Building Challenge, and the UK’s Climate Change Agreement. These targets and objectives often coincide with improvement projects that enhance things like air management, equipment efficiency, building management system tuning, and in some cases, large capital projects to refresh facility supporting infrastructure. This action confirms improvement, or those sites that miss the target in accordance with PUE and ISO 30134.

Figure 4: IMDC underground lake, leveraging geothermal cooling.

Once all of these aspects have been completed for the year, as well as other items such as internal audit, and feedback from relevant stakeholders, we hold a large annual management review meeting with top leadership that not only covers all required inputs and outputs from ISO 50001:2018, but also other factors from our ISO 14001 Environmental Management System, such as materiality assessment of aspects and risks, qualitative analysis of opportunities for improvement, and reviewing all legal obligations. This also includes reviewing our energy performance (PUE) year-to-year, as well as other leading and lagging energy and emissions metrics year-to-year, and vs baseline. The output from our annual review sets the pace for the rest of the calendar year, with regular check points in between in order to ensure resources, awareness, communication, and accountability.

Transparency

Iron Mountain Data Centers leads the data center industry in highly regulated compliance, environmental, sustainability, physical security and business continuity. Adding ISO 50001 to our global program was a natural and critical progression as we continued to expand our sustainability goals. ISO 50001 is a very well respected designation within the industry and as such, we are proud to promote the certification anytime it is applicable. We highlight the certification on our media & analysts interviews, sales enablement tools, website, marketing assets, videos, sales RFPs, and social media outlets.

Recently, Iron Mountain Data Centers joined the EU Climate Neutral Data Centre Pact and announced all of our sites worldwide will be climate neutral by 2030. We are also one of the 114 companies (to date) to have signed The Climate Pledge to be net-zero carbon by 2040, 10 years ahead of the Paris Agreement. ISO 50001 allows us to reach these goals and to change the way the world views data centers.

What We Would Have Done Differently

- Design the system from the start with the intention for it to eventually be a vast multi-site, as adjusting to a much larger system with M&A activity is challenging
- Include more EnPI's from the inception, in order to have more historical data
- Focus on training from a more holistic perspective, including all staff in required training by design, rather than later on as the system matured and had more removing parts included

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—Chris Pennington, Director of Energy and Sustainability

Figure 5: IMDC Global Footprint