



Customer guide to data center decarbonization



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Day by day, sustainability is being treated more like compliance and is being specified in RFPs, assessed and reported in the same way. Data center providers need to look beyond PUE, WUE and CUE, and acknowledge that they offer not only low-latency connectivity, physical and logical security, uptime, resilience, and compliance, but also trackable transparent power procurement and usage with a route to total decarbonization.

This short white paper looks at the drivers behind this shift, and how it affects the data center business. It also sets out the key steps in the route that Iron Mountain Data Centers (IMDC) has chosen to total decarbonization. The aim is to assist customers who want to understand the processes behind responsible power provision as part of their search for a reliable and transparent way to decarbonize their IT.

The changing energy landscape

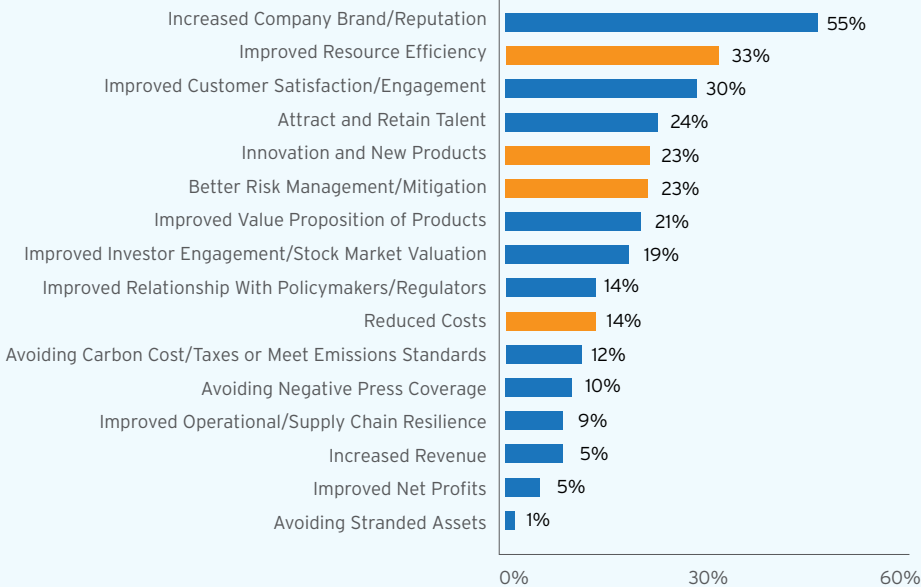
The rise of sustainability

Over the last decade, the commitments and reporting offered by data center providers who lay claim to sustainability have moved from a 'nice-to-have' to a 'must-have' customer requirement. Colocation providers are adjusting to take this into account, with some more prepared than others.

Like most market shifts, this is customer-driven. Our customers want to take clear responsibility for the power they use in our facilities, and its environmental impact. Last year more than 23,000 companies - representing \$67 trillion in market capitalization - disclosed their emissions through [CDP](#). More than 4,000 businesses and financial institutions are now working with the [Science-Based Targets](#) initiative to reduce their emissions. According to [Accenture](#), 37% of companies have set net zero targets. At the same time legislation is now being put in place to make reporting obligatory, such as the [Corporate Sustainability](#) Reporting Directive which covers over 75% of EU company turnover as well as (more recently) the [SEC requirements](#) in the US.

Soon, nearly every business with a significant IT footprint will report its Scope 1 emissions (direct), Scope 2 (indirect, e.g. from energy) and possibly Scope 3 (other indirect emissions - things like business travel or supplier-related GHG like data processing in data center and cloud facilities).

Sustainability program benefits based on top three ranked responses



n - 221, all leaders director level and above

Q. What are the top three benefits your organization has achieved to date from its sustainability program (s)?

Source: 2022 Gartner Sustainability Opportunities, Risks and Technologies Survey

According to Gartner, 75% of organizations will have implemented a data center infrastructure sustainability program driven by cost optimization and stakeholder pressures by 2027, up from less than 5% in 2022. The orange bars indicate where there is the greatest opportunity for improvement.

Drawing a line under greenwash

Despite the seriousness with which customers now take their climate targets, terms such as 'climate-neutral', 'green' and 'renewable-powered' are still often used ambiguously to define sustainability performance. Considering the above, this is no longer a sustainable business practice. To end the era of greenwash, our industry needs to trim its sustainability terminology to tailored, attested reporting on customer power use. We need to align our metrics to eliminate any double-counting of renewables. And to empower our customers we will need to recognize the difference between hour-by-hour carbon-free power and general, annual claims.

Today companies recognize that outsourced IT functions count as part of their footprint, and that means equipment and processing in data centers of all types, whether it's a dedicated colocation facility or an IaaS, PaaS or SaaS one.

Data centers as power providers

At the heart of this shift is the recognition that, as the world continues its shift to a digital economy, data centers have become a crucial part of the customer energy supply chain. We provide power to customers in the same way that utilities provide power to us, and we have similar opportunities to support a clean energy transition.

As our customers report their Scope 1, 2 and 3 emissions, they need to know the details of the power they use in our data centers - not just the number of kilowatt hours, but the sources of those hours, and the provenance of those sources. Only then are they in a position to communicate clearly to their customers, investors and regulators how sustainable their digital footprint is. This is already happening. Our biggest customers want to know where their clean power claims come from and what the mix is for power delivered to the data center. This validates our position on carbon reduction and monitoring as well as the investments we are making in building our own zero carbon supply portfolio.



Aligning our metrics

In the area of overall Scope 2 reporting, the industry doesn't have full alignment. In the world of GHG accounting it is recognised as the highest importance to avoid double counting of emissions.

Unfortunately, the [GHG protocol](#) set out two methods to advise Scope 2 power reporting, and these have created ambiguity. The first method is based on 'financial control' (who buys the power), and the second is 'operational control' (who controls the usage). While the colo operator procures energy for the site, the customer determines how that power is used. To be clear, some colo operators report IT load as the colo's Scope 2, as it purchased the power, and others report IT load as the colo's Scope 3 because the customer controls its use. As not all operators chose the same method, this has likely led to some double reporting on the [CDP platform](#) (which most of the industry reports to) with more Scope 2 being reported than is actually being used.

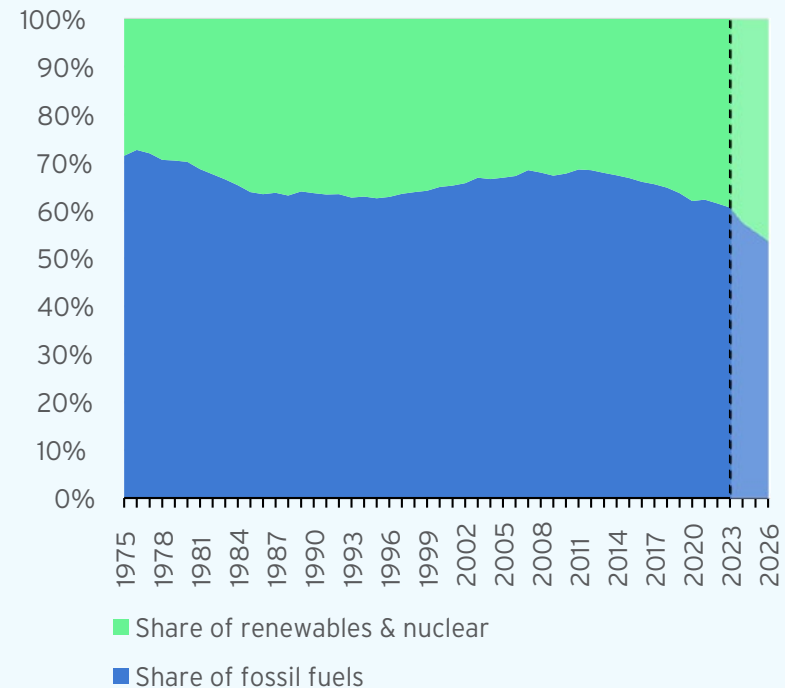
We are working on this as an industry, and as with many areas of good practice in sustainable reporting, the largest cloud service providers are aware of the issue and taking action. They are taking the path of 'operational control'. We use this method at Iron Mountain Data Centers as well, reporting IT load as our Scope 3 so as to not double count with clients reporting it as their Scope 2, but not all data center operators are aligned on this. This will become an increasingly important topic as customer Scope 2 reporting obligations increase.

Pressure in the power mix

The IT power mix is changing too. With the rise of generative AI and the huge power demands it is creating, the industry is recognizing the complexity of future power generation. A key realisation here is that wind and solar will not be enough on their own to meet the demand for a fully decarbonized grid. As Microsoft put it in their recent paper '[Accelerating a Carbon-Free Future](#)': "Complete grid decarbonization will

require a multi-technology approach that considers a range of carbon-free technologies such as wind, solar, geothermal, clean hydrogen, sustainable biomass, nuclear, fusion, energy efficiency, storage, and carbon capture and storage."

This is a complex picture and it is our job to simplify it for the benefit of our customers. A sustainable global data center provider will need not one but many clean energy generation sources until the grid itself is decarbonized, and the mix at each site will have to be defined and reported clearly to feed into customer Scope 2 reporting.



The immediate need for more power is driving a focus on all low-carbon sources, with the mix of renewables and nuclear on track to account for over 50% of global electricity generation in 2027.

Source: International Energy Agency (IEA) [Electricity 24 Report](#)

How data decarbonization works

Data decarbonization - from distributed to local

At the heart of our strategy is the recognition that, while it is an excellent device to enable further decarbonization down the line, the industry's most widespread sustainability tool - the annualised Virtual Power Purchase Agreement (VPPA) - is not fully sustainable.

Annualised VPPAs have enabled massive corporate support for clean energy projects in many markets, building renewable capacity. However, while many grids have become greener in the process, the project location has often not been within the same grid as the energy buyer. The reality that a project supported in one grid area may not make any impact in decarbonizing the power a company consumes in another caused some customers to ask about the provenance of our clean power claims. We welcome this deeper evaluation.



This is why in 2021 IMDC became the only global colocation provider to pledge to use 100% carbon-free electricity, 100% of the time (or #247CFE) by 2040. This is not the same as directly generating our own clean power straight to the rack - it is tracking power used against power purchased hour by hour on the same grid. Another way of expressing this hourly tracking is an 'hourly carbon-free energy'.

As the [United Nations](#) puts it; "24/7 Carbon-free Energy (CFE) means that every kilowatt-hour of electricity consumption is met with carbon-free electricity sources, every hour of every day. It is both the end state of a fully decarbonized electricity system, and a transformative approach to energy procurement, supply, and policy design that is critical to accelerating its arrival."

The essence of 24/7 carbon-free energy is that it is directly trackable against power used on a particular power grid. It is a positive evolution as it will help support decarbonization in all grids, for everyone; a more level playing field for a sustainable future.

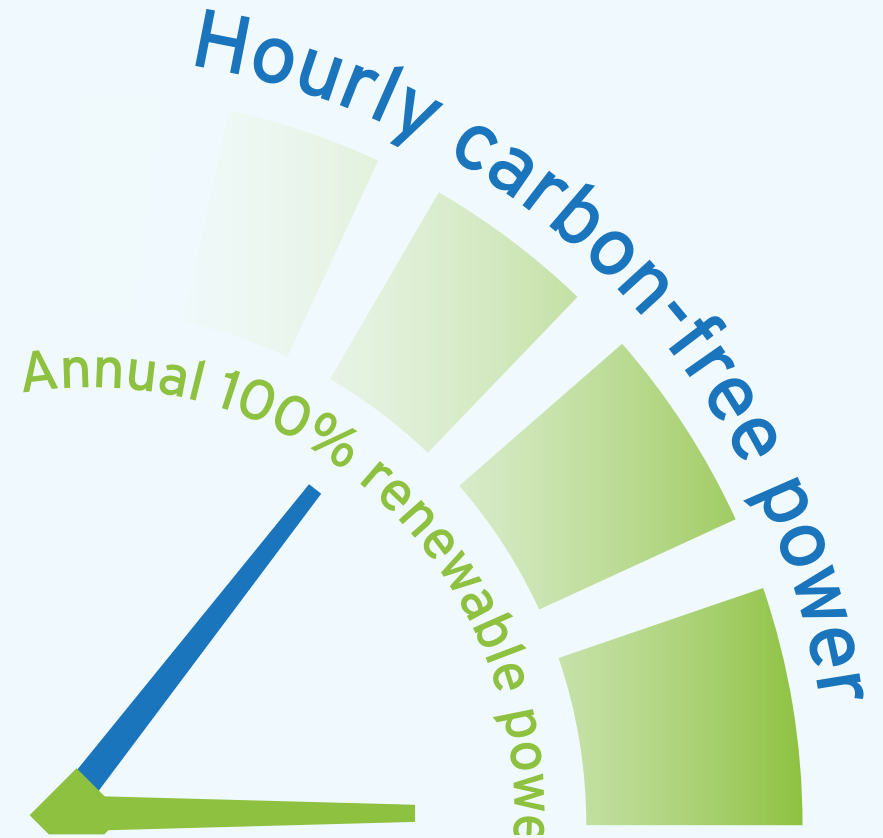
And because we recognize that achieving 24/7 carbon free energy will take time, we remain committed to matching our consumption annually with credible clean energy claims. This 'double guarantee' provides customers what they need today, and enhances their claims as we make progress.

The advance party

Designing a power procurement template that enables hourly carbon-free energy is complicated; tracking power usage can be tricky, and market conditions often make it hard to 'buy local'. We're not alone in this effort, as global firms like Google and Microsoft have also pledged to become 24/7 carbon-free.

Google pioneered the concept, we followed their [model](#) for managing advanced decarbonisation, and we're seeing momentum build. While we're proud to be pioneers in this area, and encouraged by the work of other trailblazers like Microsoft, it is important that more organisations adopt more impactful goals for decarbonizing. And they are. Today there are over [150 organizations](#) committed to 24/7 carbon free energy.

There is a growing ecosystem of providers that can help firms understand their current 24/7 performance ([Flexidao](#) and [Cleartrace](#)), connect energy buyers with clean energy projects ([Level10](#)), and even retailers developing advanced, decarbonized turn key solutions ([AES](#) and [Penninsula Clean Energy](#)). Collaboration is key to accelerating our progress, and we have received great inspiration as well as excellent practical support from fellow decarbonizers at the [Clean Energy Buyers Association \(CEBA\)](#).



Offering a two-track sustainable power program allows IMDC customers to report their power usage either on an annual or site-by-site 24/7 basis, and they can also partner with us to directly support new clean energy from specific projects.

5 steps to decarbonization

The following five steps give a good overview of the tasks we have undertaken to achieve hourly carbon-free energy so far. They can be pursued by any multi-country multi-tenant organisation, and used as a guide to responsible infrastructure selection by colocation customers.



1 Invest in clean energy for the long haul, and buy local

Our road to sustainability has always been customer-driven, so it can be best understood in the context of evolving customer needs. We recognised in 2017 that customers wanted their data center power to have positive environmental performance, and we established off-take agreements with renewable energy providers to cover our whole operational load. This approach has become popular: the price of renewables has been extremely competitive, and last year nearly [45 GW of renewable power](#) in the US - well over half of the world's corporate clean energy purchases - was contracted to data centers. In 2019 we launched [Green Power Pass](#) to pass the benefit of clean power onto customers; GPP is a certificate customers can use for their environmental reporting to credibly reflect the use of clean power at our facilities.

Power Purchase Agreements and selecting local, quality clean power rate programs where they exist are important demand signals to the market that we need more clean power. Committing to long term off-take from local new projects does more than just secure a credible green power claim, it demonstrates real commitment compared to purchasing certificates on an annual basis.



Collaboration is accelerating our progress and the tools we are developing together are available to everyone. You can see it in action in our recent video 'Transforming our Future', which features partners like ClearTrace, Microsoft and Google and explains the processes and collaborations behind the move of data centers from annual to hourly clean energy.

2

Build a customer-focused framework

Building on the customer theme, in May 2021 we committed ourselves to further decarbonize our power beyond traditional annual matching. This is a natural next step as we are collectively recognizing that annually matching our load leaves a lot of hours dependent on fossil-based generation. There has been growing support for [24/7 Carbon Free Energy](#) by companies, communities and even governments - and these are data center customers.

Clearly this growing number of climate minded organizations will seek providers that enable them to turn their data center footprint into a lever for supporting hour by hour clean energy. We did not abandon our past renewable energy VPPAs, as they play an important role in our overall coverage as we transition to more granular clean energy.

Today we have a portfolio of solutions in play to help customers achieve their clean energy goals. This includes our most impactful, local and hourly clean energy matching, long term Power Purchase Agreements and also some short term certificate purchases. Creating this framework supports all of our customers' sustainability needs while we continue our journey towards locally sourced and carbon-free power every minute of every day, everywhere.

3

Track sites & build carbon heat maps

Generation and consumption tracking is the key - creating time-tagged heat maps that show where our customer's hourly IT load is being matched with clean energy and where the gaps are that we need to cover. As a first step to this goal, we developed an agreement with [RPD Energy and Direct Energy](#) to track hourly renewable energy supply and compare it to our load. We then started working with [Cleartrace](#) for our US data centers, and [Flexidao](#) in Europe, to capture data on how we are performing and generate traceable, verifiable reporting. This is a gradual but necessary process.



Tracking action: In 2023 we made excellent progress in understanding hourly clean energy use across our pilot sites. As this CFE Profile of our US sites in Ohio, Pennsylvania and New Jersey shows, we achieved 99.5%, 99.9%, and 98.5% carbon-free power for January, February and March 2023 respectively. and throughout April 100% of power used was matched with locally produced carbon-free energy each hour of every day.

4

Align with common standards

Our decarbonization performance translates into our customers' published results. They need to be able to trust the performance figures and methodologies we use as they take these figures and put them into their own reports. Trust is created through transparency and use of common standards. For reporting GHG emissions, we have aligned our efforts with the ISO 14064-1 standard and have our results verified by a third party to confirm our use of standard methodologies. IMDC is currently the only global colocation company that has had its GHG emissions verified by a third party to the ISO 14064 standard.



5

Iterative innovation

Purchasing large amounts of power for our customers to use inside our facilities creates opportunities to support new and exciting decarbonization solutions. This may be small, infill projects like our May 2023 [Corporate Power Purchase Agreement \(CPPA\) with Sunrock](#) for solar energy from the port of Rotterdam (4.4 MW) and Oud Gastel (1.3 MW) to our AMS-1 Amsterdam facility, or larger, complex efforts like our innovative June 2023 ['run of river' hydro development PPA with Rye Development](#), to add generators to existing dams in Pennsylvania and West Virginia which could create up to 150 MW of clean power. Innovative approaches to clean energy today can become widely

accessible, common best practices in the future. Rooftop and ground mounted solar are good examples of mature solutions that are first moves for clean energy in most places around the world, like the largest rooftop solar array of any US data center in our [New Jersey](#) facility or our more recent array in [Rosendale, NY](#), which takes our global on-site generation capacity to 21.3 MW.

Our innovative June 2023 'run of river' hydro development PPA with Rye Development, will ensure that generators are added to dams in Pennsylvania and West Virginia. These have the potential to create up to 150 MW of 24/7/365 customer power over the next ten years

Innovation is an iterative process that builds on what we have done to continue exploring new ways we can close the gap to 100% carbon free energy. Solving the last 10% will become incrementally more difficult and expensive, and this will require investments in new technologies, and new forms of storage and generation.



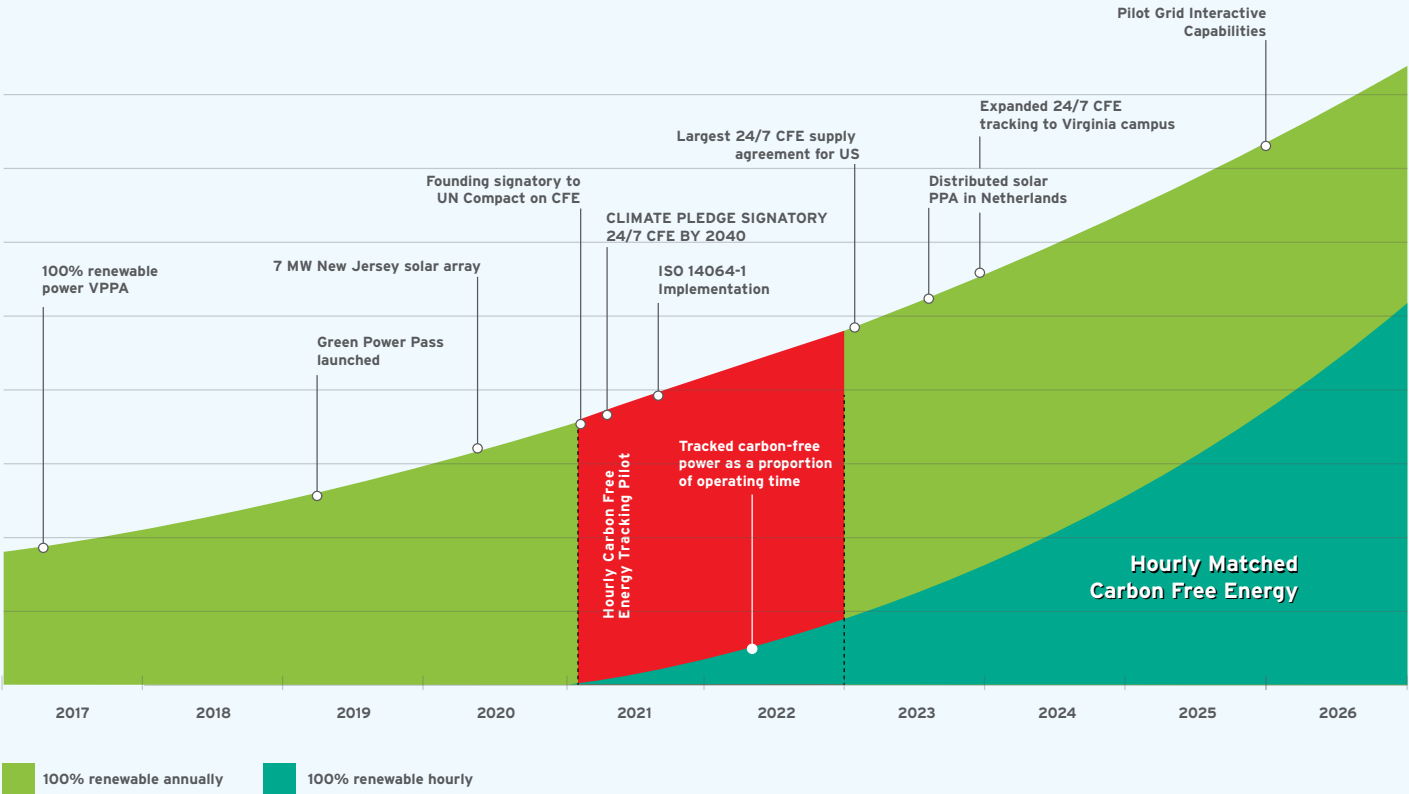
Tracking progress

Progress to date

Decarbonization is a long-term undertaking, but benchmark results have been extremely encouraging. In 2023 we made excellent progress in our five initial pilot sites. Since then our carbon-free initiative has expanded and gained even more momentum. Across the whole of 2023 we achieved 186,457 MWhrs matched with locally produced carbon free energy for our initial five sites in the US and UK.

Take a moment to consider that. Clean energy resources like wind, solar and hydro are intermittent, and we're demonstrating that it is possible to match nearly every hour of each day with locally produced carbon free energy. This is an inspiring milestone in the clean energy transition.

Progress towards 24/7 carbon free energy



This chart shows some of the key points on our journey towards hourly-matched carbon-free energy, including the analysis phase and the ongoing restructuring of our renewable power purchasing agreements to tap into renewable power closer to the point of use.

Next steps



Digitalization may be the key to a sustainable future, but it will take focused action and cooperation to achieve this, and there is no excuse for delay. As the IEA points out in their [‘Digitalisation & Energy’](#) paper, energy suppliers can use digital tools to improve operations, and explore the transformational potential of digitalisation to help create a highly interconnected energy system. The same applies to many other sectors looking to enhance efficiency and reduce impact. Digital tools - and AI and ML in particular - have the potential to transform not just what we do and how we live, but the impact we have on the planet.

The infrastructure that supports the digital economy while we develop these tools has a very important pioneering role to play in this process, not just in decarbonizing our own industry but also in showing the way for other power-hungry sectors.

We have a long way to go, but hopefully this guide shows that we are making progress down a road which is worth travelling - the road to the total decarbonization of our customer IT.

We want others to join us. By sharing our experiences we hope to explain what works and what doesn’t and promote participation from fellow providers and interested customers.

Investing in long-term, local, 24/7 clean energy will help our customers achieve their ESG goals faster. We will need to make significant innovations and investment to reach 100% and the last few percent will definitely be the hardest, but hopefully the next guide in this series will share insights into how we overcame these challenges to achieve total decarbonization.

“ It’s very important for companies and organizations to work together. This is a problem that is so difficult that we all can’t solve it on our own. We have to work collectively.”

[Michael Terrell, Senior Director for Climate, Google, in our recent video ‘Transforming our Future’,](#)



Get in touch

With all of the compliance certifications in place, low-carbon building and facility efficiency, and a growing bank of long-term local renewable power suppliers, IMDC puts a lot of energy into meeting customer sustainability needs. IMDC stands out in several areas:

- › the only colocation provider with comprehensive certifications for accurate customer GHG reporting, including ISO 14064 verification
- › the first colocation provider to complete a BREEAM-accredited data center in North America, with a commitment to BREEAM certification for all new builds
- › developers (in partnership) of an award-winning AI-driven cooling efficiency initiative which has huge potential for the industry
- › the only global colocation provider to have committed to 24/7 Carbon-Free Energy over and above our customer guarantee of 100% annual clean energy
- › the only data center provider to also provide a fully-integrated global hardware asset management and IT Asset Disposition (ITAD) service through Iron Mountain ALM

If you are interested in partnering with us to decarbonize your IT, please get in touch:

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About

Iron Mountain Data Centers operates a global colocation platform that enables customers to build tailored, sustainable, carrier and cloud-neutral data solutions. As a proud part of Iron Mountain Inc., a world leader in the secure management of data and assets trusted by 90% of the Fortune 1000, we are uniquely positioned to protect, connect and activate high-value customer data. We lead the data center industry in highly regulated compliance, environmental sustainability, physical security and business continuity. We collaborate with our 2,000+ customers in order to build and support their long-term digital transformations within our 3.5M SF global footprint spanning 3 continents. For more information, visit www.ironmountain.com/data-centers

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