

A photograph of three white wind turbines in a grassy field under a blue sky with light clouds. The turbines are arranged in a line, with the largest one in the foreground and two smaller ones in the distance. A stone wall and a fence are visible on the right side of the field.

Green Data Centres
are Imperative
for Enterprise Success



Summary

From the world's largest companies to smaller enterprises, sustainable practices and environmental stewardship are becoming core to enterprise business strategy. In fact, sustainability—once seen as a forward-thinking competitive advantage—has evolved into a necessity in the global economy.

With the rapid growth of the digital economy, the demand on the data centres literally powering it is growing in lock step. When taken as a class of building, data centres are among the highest consumers of power. It's more critical than ever for enterprises to seek alternative energy solutions for their data centre infrastructure.

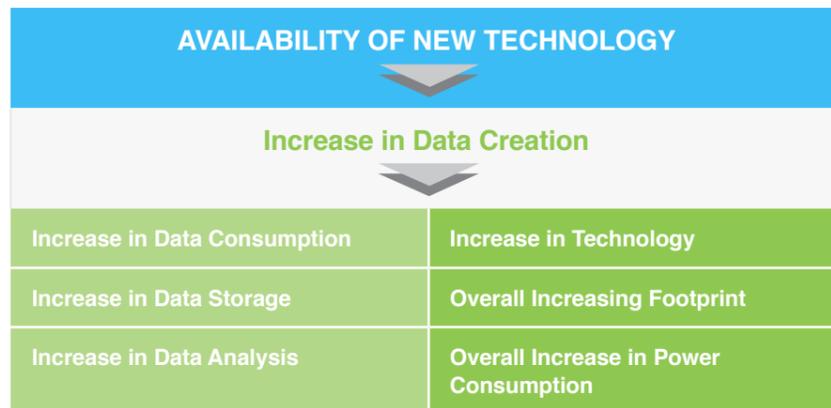
Taking a Powerful Leap

So how can your organisation move towards more sustainable practices? While there are many ways to reduce carbon footprint and energy usage, one of the most impactful strategies is to source renewable energy in your data centres.

Read this white paper for a deep look at clean energy, how to acquire it and what to look for in your data centre strategy.



Rising Power Demands



Ever-advancing technology is enabling the increase of data creation, consumption and storage. With these increases, a domino effect occurs.

This increase in data creation is driven by the rapid growth of the data we create and store every day. IDC forecasts that global data will grow to an astounding 163 zettabytes by 2025¹, which is equivalent to watching the entire Netflix catalog 489 million times.

While efforts to improve the energy efficiency of data centres—such as cooling system upgrades, expanding the operating parameters of data halls, and optimising air flow by using smart sensors and controls—will remain an important area of focus, organisations are also capturing significant sustainability gains by switching to clean energy.

As more and more data is captured, computed, and stored, companies are looking for ways to offset the growing environmental impact of their data centres. Many are constructing green-certified data centres, but the biggest impact comes from sourcing renewable energy to power these high energy use facilities. A number of leading global companies are also becoming more vocal in demanding that their data centre providers source renewable energy for their data centre energy use.

¹ U.S. Global Change Research Program, "Fourth National Climate Assessment".
<https://nca2018.globalchange.gov/>
 (Online Resource)

Powering Your Business With Renewable Energy

Since data may seem abstract and formless, it might be strange to think of it as having a carbon footprint. But data has a physical form since it lives in physical buildings such as data centres. Data centres are among the highest consumers of power. In the U.S. alone, data centres consume more than 70 billion kilowatt-hours of electricity a year which is equivalent to approximately 2% of all electricity use in the U.S.² So moving towards sustainably operating your data centre can make a much needed, positive impact on the environment.

What Is Renewable Energy?

Renewable energy is derived from sources such as the sun (solar), wind, the movement of water (hydroelectricity), biofuels (fuel derived from organic matter), and geothermal activity. In other words, renewable energy comes from sources that are not depleted when used and do not emit carbon emissions which are harmful to the Earth's atmosphere.

The "brown" alternative is energy derived from fossil fuels that emit carbon, such as natural gas, coal, and oil. In the gray area are technologies like nuclear power, which is typically considered "zero carbon" but not renewable and can carry additional environmental concerns related to the disposal of radioactive waste.

Renewable energy sources are in higher demand than their brown and gray alternatives and are becoming more affordable. Additionally, advances in technology are increasing their availability for purchase. The International Energy Agency (IEA) reports "renewables capture two-thirds of global investment in power plants to 2040 as they become, for many countries, the least-cost source of new generation."³

² <https://betterbuildingsinitiative.energy.gov/challenge/sector/data-centres>

³ <https://www.iea.org/weo2017>





How Renewable Energy in the Data Centre Helps Your Enterprise

Good For the Planet and Good For Business

Implementing green practices in your data centre not only benefits the planet but is also good for business. According to AFCOM's 2018 State of the Data Centre Industry report, approximately 42% of respondents have or are planning to deploy a renewable energy over the next year. And 60% of those respondents indicated that this new renewable energy source will help them lower overall TCO of their data centre while helping them achieve green initiatives.⁴ Using fewer non-renewable resources means reducing overall utility costs.

Lower Costs While Maintaining Consistent Performance

Reducing energy usage doesn't have to mean compromising power efficiency. In fact, renewable energy is now seen as a reliable source of power which can help keep Power Usage Efficiency (PUEs) low. A lower PUE means that power is being used more efficiently which ultimately translates to lower operating costs for you. As of 2018, Google touts an average PUE of 1.12 across all their data centres running on 100% renewable energy. For reference, a PUE of 1 is considered perfect.

Improve Brand Image and Customer Loyalty

Consumers are becoming more and more aware and interested in social and environmental issues. They see a company's values as equally important to its responsible business practices.⁵ In the U.S., 80% of consumers care about the use of renewable energy according to a survey conducted by the National Renewable Energy Laboratory (NREL).⁶ Sustainability is no longer seen as a nice-to-have initiative. Rather, it's becoming a necessary corporate pillar for thriving in the competitive landscape and gaining consumers' trust and loyalty. According to Deloitte, "energy management has become table stakes for competitiveness."⁷

4 <https://www.datacentreknowledge.com/afcom/state-data-centre-industry-2018-where-we-are-and-what-expect>

5 <http://www.conecomm.com/2017-cone-communications-csr-study-pdf>

6 <https://www.nrel.gov/docs/fy11osti/50988.pdf>

7 (2017) Deloitte Resources 2017 Study. <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-deloitte-resources-2017-study-energy-management.pdf>

Green in the Datacentre

One startling prediction for the future of ICT's (Information and Communications Technology) energy consumption is that data centre electricity use will significantly increase by 2030 to 8% of the projected global demand.⁸ However, others believe that with the adoption of more energy efficiency measures, energy consumption may only grow to 3%.⁹

The Rise of Hyperscale

Over the past decade, there has been more of a shift towards hyperscale computing. Hyperscale data centres allow businesses to store and process massive amounts of data and can be more energy efficient.¹⁰ They are able to accommodate and easily scale up to thousands of servers while taking a more bare-bones approach to design. Stripping away unnecessary functions that use up energy, such as certain lighting and cooling equipment, help to lower PUEs. A 25% drop in energy usage is estimated if 80% of servers were transferred to hyperscale data centres. Leading companies like Google, Amazon, and Facebook were early adopters of hyperscale and are fueling its growth.

AI and ML in the Data Centre

Artificial intelligence (AI) and Machine Learning (ML) have been proven to enhance energy efficiency in the data centre. In 2016, Google implemented an AI and ML system to manage the cooling of its data centres and saw energy savings of up to 40%.¹¹ The AI system was able to adapt and to manage the cooling of its data centres, power, and pump speeds and then predict future temperatures and pressures over time. This helped prevent overutilising unnecessary energy by learning from past patterns.



8 <https://www.mdpi.com/2078-1547/6/1/117>

9 International Energy Agency. Digitalisation and Energy (IEA, 2017). <https://www.iea.org/publications/freepublications/publication/DigitalisationandEnergy3.pdf>

10 Shehabi, A. et al. United States Data Centre Energy Usage Report (LBNL, 2016); available at <https://go.nature.com/ejg7sr>

11 (2016, July 20). DeepMind AI reduces Google Data Centre Cooling Bill by 40%. Retrieved from: <https://deepmind.com/blog/deepmind-ai-reduces-google-data-centre-cooling-bill-40/>



4 Ways to Source Clean Energy

Whether you run your own data centre, or work with a partner, there are four key ways for enterprises to source clean energy.

1. Purchase green

The first and often simplest approach is to simply select the “green power” option from your local utility company, when such a program is offered.

Utilities meet clean energy obligations by purchasing power from clean energy projects and then purchasing renewable energy certificates on their customers’ behalf. Utilities charge a premium price for this clean energy product, often between \$0.01 and \$0.03 per kilowatt-hour, which contributes to the perception that clean energy is more expensive than their standard fuel mix, which typically consists primarily of “brown” power sources.

2. Purchase certificates

An alternative pursued by many businesses is to purchase renewable energy certificates (referred to as RECs) primarily from third-party aggregators.

While not a direct carbon offset, RECs can help reduce indirect emissions from electricity use. Each REC represents one megawatt-hour of energy generated from renewable sources.

Aggregators procure RECs from renewable power plants on behalf of their clients. This approach provides flexibility to specify the type of renewable energy, as well as to purchase RECs for facilities that do not have local utility green power options. Prices vary but are typically a fraction of the cost of utility green power programs.

Organisations can buy third-party-verified and tracked RECs, knowing that the money will ultimately work its way back to those power plants that feed in energy from clean energy sources. A criticism of this approach is its low “additionality,” a measure of how impactful the effort is to add new renewable energy capacity and displace fossil fuels.

3. Buy direct

A third route to procure clean energy is to purchase renewable energy directly from a power plant developer. This is increasingly the path pursued by technology companies such as Apple, Google, Facebook, Microsoft, and others.

These power purchase contracts commit the buyer to purchasing the power and RECs produced by a wind farm, solar installation, or other renewable project at a fixed price, typically for a period of 10 to 25 years.

These contracts, referred to as power purchase agreements (PPAs), provide direct “line of sight” from the energy purchaser to the clean energy producer. These transactions often are for 20 to 100 megawatts or more of power capacity. Smaller organisations may not use sufficient energy to warrant an arrangement of this size but there may be sources available to meet their needs too, including packages that aggregate demand for smaller blocks of energy across multiple buyers, and community solar share programs.¹² These contracts also provide the developer with an incentive to develop new projects to meet the demand.

Additionally, virtual PPAs (VPPAs) are becoming more prominent. VPPAs are long-term financial agreements that are structured typically for 10-20 years. They “contract for differences between the fixed renewable prices and a wholesale price settled on the grid at either the hub or the node.”¹³

4. DIY

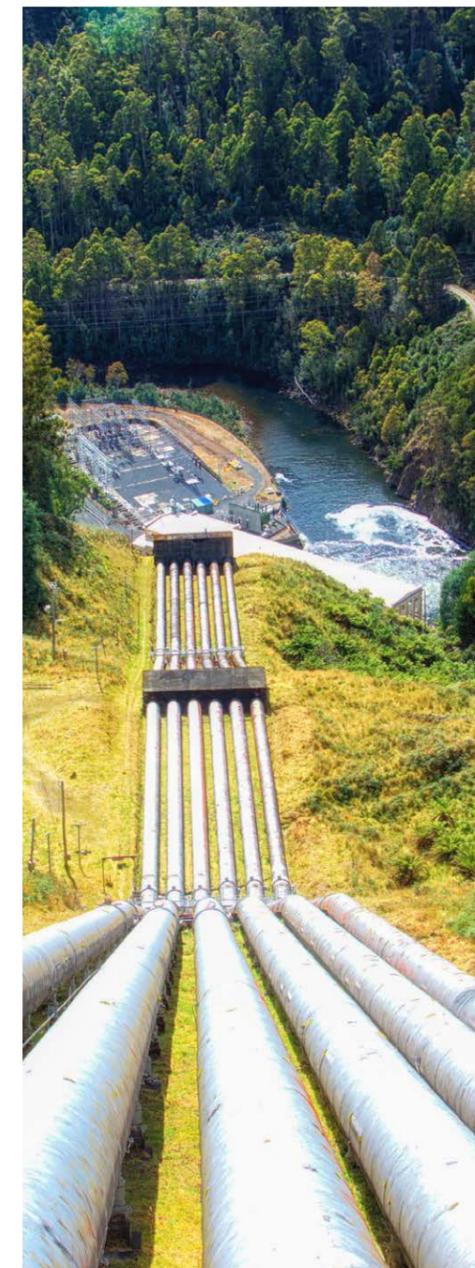
The fourth route is the most direct: do it yourself. Some companies opt to build and operate renewable power solutions by installing solar panels, wind turbines, or biogas-powered fuel cells at or near their data centre. Companies that take this on-site approach are also often sourcing clean energy from some or all of the other options already presented.

Building renewable generation on-site is a less common tactic because the clean energy capable of being produced on-site tends to account for only a small portion of the data centre’s total energy need.

An increasing number of businesses are using one or more of the four approaches outlined in this paper to supply their data centres with renewable energy. Each approach has a mix of advantages and shortcomings for a given company, but with a careful study of the available options many businesses are finding that powering their data centre with clean energy is more feasible than they had previously thought.

¹² Silverstein, Ken. (2017, January 10). Smaller Businesses Want Renewable Energy Developers to Spread The Green. <https://www.forbes.com/sites/kensilverstein/2017/01/10/smaller-businesses-want-renewable-energy-developers-to-spread-the-green/#302ebf5c6362>

¹³ Mattson-Teig, Beth. (2018, July 7). Increasing Renewable Energy in Real Estate. <https://www.reit.com/news/reit-magazine/july-august-2018/increasing-renewable-energy-real-estate>





What to Look for in a Sustainable Data Centre Provider

Fortunately, there are many programs that are in place to promote the collective sustainability effort. Here is a partial list of these programs that you should look for when choosing a sustainable data centre provider.

ENERGY STAR Certification

ENERGY STAR is a joint Environmental Protection Agency (EPA) and Department of Energy program. It is a voluntary program that helps to identify and promote energy efficiency in products, homes and buildings. Look for the Energy Star Certification or Energy Star Certified label.¹⁴

Green Power Partnership

The Green Power Partnership is a voluntary EPA program designed to increase the use of renewable electricity in the United States and use “green power as a way to reduce the environmental impacts associated with conventional electricity use. Partners commit to use green power for all, or a portion, of their annual electricity consumption.”

Green Certifications

LEED, or Leadership in Energy and Environmental Design, is a certification program for buildings and communities that guides their design, construction, operations and maintenance toward sustainability. It is operated by the U.S. Green Building Council.¹⁵

Also look for green certifications such as BREEAM, Green Globes, BCA Green Mark and CEEDA.

The Better Buildings Challenge

The Better Buildings Challenge represents the joint effort of hundreds of public and private sector organisations to develop and share strategies addressing the energy consumption dilemma. Participating government agencies are targeting a cumulative 40% reduction in greenhouse gas emissions by 2025. More than 300 private sector participants have enrolled 4.2 billion square feet of building space in the program.¹⁶

¹⁴ <https://www.energystar.gov/about/join-energy-star>

¹⁵ <https://www.epa.gov/greenpower/green-power-partnership-program-overview>

¹⁶ <https://betterbuildingsolutioncentre.energy.gov/better-buildings-initiative-2016-infographic>

Interxion Sustainability

At Interxion, a Digital Realty Company 100% of our energy is from renewable sources. We’ve pioneered energy-saving designs and harnessed everything from arctic winds to underground aquifers to the Baltic Sea to reduce our carbon footprint. Innovative technologies such as district cooling (STO & CPH), river cooling (MRS) and geothermal sources (AMS) with on-going investigations on district heating, fuel cells, etc. support our commitment to sustainability.

Interxion’s focus on energy efficiency is reinforced through its Energy Strategy Group, which creates, monitors, and maintains programmes within the company to ensure energy efficiency is a component of engineering and operations activities at all levels.

As an active member of industry groups focused on Green IT and energy efficiency, we strive to maximize use and support of sustainable energy sources across our European footprint.

Core to our operational ethic is continual management of our use of energy, measured through Power Usage Effectiveness (PUE), which measures how efficiently a data centre uses energy.



About Interxion: A Digital Realty Company

Interxion: A Digital Realty Company, is a leading provider of carrier- and cloud-neutral data centre services across EMEA. With more than 700 connectivity providers in over 100 data centres across 11 European countries, Interxion provides communities of connectivity, cloud and content hubs. As part of Digital Realty, customers now have access to 47 metros across six continents.

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Cofounder: Uptime Institute EMEA chapter. **Founding member:** European Data Centre Association. **Patron:** European Internet Exchange Association. **Member:** The Green Grid, with role on Advisory Council and Technical Committee. **Contributor:** EC Joint Research Centre on Sustainability. **Member:** EuroCloud.

Interxion is compliant with the internationally recognised ISO/IEC 27001 (537141) certification for Information Security Management and ISO 22301 (BCMS 560099) for Business Continuity Management across all our European operations. © Copyright 2020 Interxion. [Place code here](#).