

## Data Centers: How Equinix shrinks the carbon in the Cloud.

The move from physical to digital media has changed our lives in many ways. We read online more and on paper less. We stream music and movies rather than buy tapes and discs. Though we may accumulate less physical items, we certainly use a lot more data. And data has a large, and growing, carbon footprint.

### The What:

A wind purchase power agreement builds renewable energy capacity by providing demand and capital for the clean energy marketplace.

### The Who:

Equinix, Inc. is a large real estate investment trust that specializes in data centers.<sup>1</sup>

### The Value-Added Proposition:

Investment into wind and purchase of renewable energy credits (RECs) brings Equinix's data centers' energy use in its US portfolio to 100% renewable energy.



Top Right:  
Interior of Equinix IBX data center DC12 in Washington, D.C.<sup>2</sup>

Bottom Right:  
Invenergy, LLC. Wake Wind Farm, Texas.<sup>3</sup>

### Exponential energy use at data centers

We are online and using the “Cloud” everywhere now. All that data we use is sorted, routed, and stored in data centers. These buildings are the brick-and-mortar to the cloud. If you use the internet, then a data center is likely somewhere nearby. Even with fiber optics, data still travels faster when it has less far to go. You’ll find major data center clusters wherever data use is heavy. Wall Street, Silicon Valley, and Hollywood are all obvious data hogs. So is the federal government and the defense industries so you’ll find many centers in Virginia too.

Data centers consume 100 to 200 times more energy more than similar sized buildings.<sup>4</sup> Power demands for computing and cooling alone are 2x higher than normal office uses.<sup>5</sup> And that power is required 24 hours a day, 7 days a week because the internet never shuts off. It is estimated the information technology sector consumes 7% of global electricity.<sup>6</sup> Using so much global energy puts a spotlight on what types of energy is being used at technology companies and the data centers that house internet services across the globe.

In 2010, the advocacy organization Greenpeace began campaigning for technology companies to use more renewable energy. Their “Clicking Clean” program initially gave many tech firms low scores.<sup>7</sup> Leading brands like Google, Apple, Amazon, and Salesforce began switching to renewables. Equinix, a large data center REIT that has many of those tech firms as clients, determined they wanted to lead this revolution and joined the RE100, an alliance of companies committing to using 100% renewables.

Data centers use more energy than is practical to generate onsite. Installing solar panels on the roof won’t get you enough power. It’d be nice if Equinix (and everyone else) could simply opt to buy only renewable energy from their local utility. But depending on your location, you may not have that option. In the US, there are three primary grid systems – the Eastern Interconnection, the Western Interconnection and the Texas Interconnection. The energy you buy depends on the energy sources fed into these grids from utility electric generation in each region and in each state. For instance, coal-fired plants accounted for 25.4% of electricity generation in Texas, 3.8% in Virginia, and only 0.1% in California. Renewable energy sources made up 35% in California, 16.1% in Texas and 8.5% in Virginia.<sup>8</sup>

To source more renewable energy Equinix had to determine their energy goals and assess the local “energy mix” for all of their centers. Equinix has many multi-tenant data centers. Somewhat uniquely, they invoice each client an energy bill alongside the rent. This allows Equinix to more accurately assess energy needs and aggregate demand. The REIT then determines what the local utility

provider can deliver in terms of renewables for each location. When the local utility doesn’t provide pathways to renewable energy sources, Equinix came up with an alternative.

In 2015, Equinix completed Wind Purchase Power Agreements (PPAs) with renewable energy firms NextEra Energy and Invenergy. A PPA is a contract between the buyer and seller of energy for a specific amount of energy at a specific price. By guaranteeing the purchase of 225 Megawatt-hour (MWh), Equinix enabled these providers to complete the build out of their wind farm projects in Oklahoma and Texas.<sup>2015</sup> This contract has contributed in bringing Equinix’s North American portfolio of data centers to use 100% renewable energy.

Interestingly, the energy from the wind power purchase agreement is generated in the middle of the country where the wind is, not where the data centers need it – this a virtual PPA. It’s inefficient to move electricity that far. This is where Renewable Energy Certificates (RECs – *see box*) come in to play. With the virtual PPA in place, Equinix is allocated RECs for all the energy it purchases from NextEra and Invenergy. The company applies these credits towards its overall energy use at its data centers across the US.

The RECs allow Equinix to signal to the market they are a buyer of green energy. Technically, the actual energy mix delivered to each data center may not be green due to the local grid. But by financing additional wind power to come online via the PPA, and accounting for this energy through RECs, Equinix is contributing to the demand for renewable energy and changing the way the cloud is powered.

### What is a Renewable Energy Certificate?

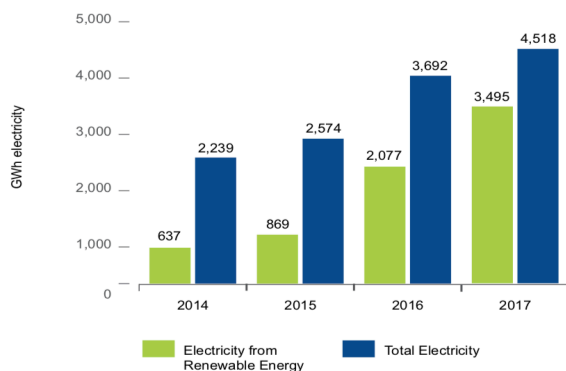
Once energy enters into the grid, from any source, it is just energy and we lose track of its origin. A Renewable Energy Certificate or REC is issued for every Megawatt-hour (MWh) of electricity generated and delivered to the grid by a renewable energy source. One MWh is enough to power nearly 1,000 homes for a year. RECs are the currency of the renewable energy market – they allow purchasers to demonstrate demand for renewable energy and provide revenue for it.<sup>10</sup> RECs are uniquely numbered, tracked, and retired; one REC cannot be used by another entity. Anyone can buy RECs – individuals and companies that do so are effectively buying green energy on the grid.

REIT making moves to the new low-carbon economy

Equinix builds and manages data centers around the globe. Two decades ago the company began providing a neutral location where various data carriers could co-locate their servers and associated hardware. Since then, the increased need for digital connectivity and demand for internet “up-time”, means that it is no longer economically viable for many small businesses to house their own

servers. Equinix serves these companies by hosting the company’s servers that need to interface with the cloud in Equinix’s centers. They also serve larger sized companies that might require servers in multiple locations. Ironically as more companies need online portals and data storage moves into the cloud, there is an increased demand for outsourced physical internet data storage locations.

Global Electricity Consumption (Gigawatts-hour GWh)



Equinix recognizes the economic viability of investing in green energy solutions. At the end of 2017, Greenpeace graded Equinix a “B” for efforts – scoring highest among data centers – as the company now gets 77% of their global energy from renewables, up from 56% the year before:

- 100% renewable in the U.S. (excluding the recent acquisition of 29 data centers from Verizon)
- 73% in Americas (North, Central, South)
- 65% in Asia-Pacific
- 89% in Europe, Middle East, Africa (EMEA)
- 13 alternative energy fuel cell installations totaling 37 MW capacity the U.S.<sup>11</sup>

Source: Equinix, Inc. (2017). “Connecting with purpose: Equinix 2017 Corporate Sustainability Report.” p. 12.

How does this case study correspond to the sustainability metrics of the Vert Global Sustainable Real Estate Strategy?

The investment strategy for the Vert Global Sustainable Real Estate Fund uses a rules-based approach to evaluate the sustainability of a publicly-traded REIT. Equinix’s leadership demonstrates the following characteristics that reflect our key performance indicators shown in the table below:

Key Performance Indicator	Equinix Virtual Wind Purchase Power Agreement
Stakeholder Engagement	Awareness and education for the local utilities, the end-user tenant. Continual negotiations with energy providers.
Energy Reduction	Taking proactive action to move its energy mix towards 100% renewable energy in its overall portfolio.

## Notes and Sources:

- <sup>1</sup> Equinix, Inc. is 3.93% of the Vert Global Sustainable Real Estate Fund (VGSRX) as of December 31, 2018.
- <sup>2</sup> Interior of Equinix IBX data center DC12 in Washington, D.C. Accessed at: Equinix, Inc. [www.equinix.com](http://www.equinix.com)
- <sup>3</sup> Invenergy LLC. Wake Wind Farm near Lubbock Texas. Accessed at: <https://www.equinix.com/newsroom/press-releases/pr/123421/equinix-signs-power-purchase-agreements-that-bring-its-north-american-data-centers-to-100-renewable-energy/>
- <sup>4</sup> Energy Efficiency and Renewable Energy (March 2011). "Best Practices Guide for Energy-Efficient Data Center Design." United States Department of Energy, p.1. Accessed at: <https://www.energy.gov/sites/prod/files/2013/10/f3/eedatacenterbestpractices.pdf>
- <sup>5</sup> US Energy Information and Administration, EIA (October 5, 2016). "Office buildings with data centers use significantly more electricity than other offices." Accessed at: <https://www.eia.gov/todayinenergy/detail.php?id=28232>
- <sup>6</sup> Greenpeace (2017). "Clicking Clean: Who is Winning the Race to Build a Green Internet?" Greenpeace, p.5. Accessed at: <http://www.clickclean.org/usa/en/>
- <sup>7</sup> Ibid.
- <sup>8</sup> US Energy Information and Administration (various dates 2016-2018). "State Profile and Energy Estimates." EIA. Accessed at: <https://www.eia.gov/state/compare/?sid=VA#?selected=US-CA-TX-VA-WV>
- <sup>9</sup> Equinix (2015). "Equinix Signs Power Purchase Agreements that Bring its North American Data Centers to 100% Renewable Energy." Newsroom, Equinix. Accessed at: <https://www.equinix.com/newsroom/press-releases/pr/123421/equinix-signs-power-purchase-agreements-that-bring-its-north-american-data-centers-to-100-renewable-energy/>
- <sup>10</sup> US Environmental Protection Agency (June 5, 2018). "Green Power Partnership: Renewable Energy Certificates." EPA. Accessed at: <https://www.epa.gov/greenpower/renewable-energy-certificates-recs>
- <sup>11</sup> Equinix, Inc. (2017). "Connecting with purpose: Equinix 2017 Corporate Sustainability Report." p. 11.

The Vert Global Sustainable Real Estate Fund holds publicly traded REITs. The Fund does not hold any of the other companies or individual buildings discussed when describing Equinix, Inc.'s area of business.

Fund holdings and sectors are subject to change at any time and should not be considered a recommendation to buy or sell any security.

**Mutual fund investments involve risk. Principal loss is possible. Investors should be aware of the risks involved with investing in a fund concentrating in REITs and real estate securities, such as declines in the value of real estate and increased susceptibility to adverse economic or regulatory developments. Investments in foreign securities involve political, economic and currency risks, greater volatility and differences in accounting methods. A REIT's share price may decline because of adverse developments affecting the real estate industry. REITs may be subject to special tax rules and may not qualify for favorable federal tax treatment which could have adverse tax consequences. The Fund's focus on sustainability may limit the number of investment opportunities available to the fund and at time the fund may under perform funds that are not subject to similar investment considerations.**

*The Vert Global Sustainable Real Estate Fund's investment objectives, risks, charges, and expenses must be considered carefully before investing. The statutory and summary prospectuses contain this and other important information about the investment company, and may be obtained by calling 1-844-740-VERT or visiting [www.vertfunds.com](http://www.vertfunds.com). Read carefully before investing.*

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