

# ANNUAL SUSTAINABILITY REPORT

*January 2017 - December 2017*

# Contents

<b>From the CEO .....</b>	<b>3</b>
<b>1. Environmental Impact.....</b>	<b>4</b>
1.1. <i>Renewable Energy Credits.....</i>	<i>4</i>
1.2. <i>Energy Efficiency.....</i>	<i>5</i>
1.3. <i>Green House Data One-for-One Program .....</i>	<i>6</i>
1.4. <i>Facility Energy Use.....</i>	<i>6</i>
1.5. <i>Facility Water Use .....</i>	<i>8</i>
1.6. <i>Company Travel.....</i>	<i>8</i>
1.7. <i>Diesel Emissions .....</i>	<i>9</i>
1.8. <i>Refrigerant Emissions .....</i>	<i>9</i>
1.9. <i>Total Green House Gas Emissions.....</i>	<i>9</i>
<b>2. Green House Gives: Community Engagement .....</b>	<b>10</b>
2.1. <i>Green House Gives Nonprofit Program.....</i>	<i>10</i>
<b>3. Corporate Ethics and Transparency.....</b>	<b>10</b>
<b>4. Data Privacy and Security .....</b>	<b>11</b>
<b>6. Future Goals.....</b>	<b>11</b>

## ***From the CEO***

Green House Data continues to grow organically and via strategic acquisitions, adding a unique challenge to our ongoing sustainability efforts in an industry that already faces criticism for energy consumption and carbon emissions.

I'm proud of how our team has come together to tackle this challenge. Each year we grow more and more efficient through operational practices as well as automation. We folded multiple data center facilities under our organizational umbrella as part of last year's Cirracore acquisition and met a primary goal of our previous Sustainability Report by adding them to our REC program and making them as energy efficient as possible.

While our overall electric use continues to climb alongside our growth, we have invested in local REC products that benefit our communities. We seek to give back to those communities by supporting local charities and nonprofits as well.

The transition to a national organization has not always been easy, but we've kept our sustainable charter at the forefront even as we shift business strategies and expand into new geographic markets and product categories.

That hard work has paid off with continued industry recognition as a green leader in the data center and managed service industries. Green House Data has been a stalwart member of the EPA's Top 30 Tech and Telecom rankings for Green Power Users, while Data Center Frontier and TechRepublic have both named Green House Data among the most energy efficient and sustainable operators in the market.

Ultimately we don't do this for the recognition but rather for what is right — for the environment, for our communities, for our children, for our employees, and for our stakeholders.

Thank you for your support as we continue to chase our goals of green enterprise computing.



*Shawn Mills  
President, CEO, and Founder*

## 1. Environmental Impact

Green House Data operates in an energy-intensive industry with myriad consequences for the environment. While the primary concern is electricity consumption, and the carbon emissions linked to its generation, computing equipment and associated operations like diesel generators, HVAC chemicals, and typical office functions all contribute to emissions, waste, and environmentally dangerous byproducts.

A founding tenet of the company is operating in as environmentally-friendly a model as possible. The Green House Data charter includes provisions for purchasing Renewable Energy Credits (RECs) for all energy use and striving for low Power Usage Effectiveness (PUE) ratings.

We join industry giants like Google, Facebook, Apple, and Amazon in purchasing green power and focusing on energy efficient improvements. Of course, when one of your largest business expenses is electricity, it makes sense to become more efficient. But we strive to go further than the business rationale might justify in our pursuit of green operations.

The company continues to grow and expand, adding new facilities via acquisition, building out existing data center facilities, and adding staff and customers, all of which contribute to a higher carbon footprint year-over-year. We strive to be carbon-neutral through to the purchase of RECs and tree planting. All Green House Data facilities are operated at a PUE of 1.3 or less.

Green House Data officially requires all offices to purchase disposable goods only when necessary and to source products made with post-consumer recycled content. Each

### **Power Usage Effectiveness (PUE)**

*PUE measures the total energy use of the data center compared to the energy used by IT equipment. In other words, for every watt used to power IT equipment, how much is used for cooling, lighting, and additional infrastructure?*

*Dropping from 1.8 to 1.2 PUE in a 10 MW facility can save between 36,000,000 and 100,770,000 pounds of CO2 emissions annually, depending on the electric grid region.*

*The average data center PUE is 1.8 - 2.0. Green House Data averages 1.3, with a low of 1.14 in Cheyenne DC02.*

location collects batteries and plastic bags for recycling. All electronics are recycled when they reach End of Life.

### **1.1. Renewable Energy Credits**

Green House Data invests in Renewable Energy Credits to support clean energy generation and the creation of new green energy projects. Each REC stands as a record of one megawatt-hour of renewable energy added to the general pool travelling the electric grid. When a company or individual buys an REC, they claim credit for that green energy.

The income stream from REC purchases travels through brokers and on to renewable

energy development companies, who use the extra funds for new projects like wind farms or solar arrays. Where RECs get tricky is when companies use them as part of their claims to be carbon-neutral, or strictly for marketing. An REC alone can not cancel out a company's energy use. It might lead to more renewable energy generation down the line, and it might allow claims for 100% green power. But we are all still drawing from a grid that is 67% powered by fossil fuels. We are supporting dirty energy production simply by using grid power.

The large companies who are withdrawing from RECs are starting to focus more on in-house solutions and reducing energy use rather than offsetting it. These are admirable goals and we applaud them—our strategy, too, has always been a combination of efficiency and RECs. For smaller organizations, however, building an on-site solar farm like Apple's is economically unfeasible. With an enormous upfront cost, plus the fact that even a massive array will still require additional grid power (especially in energy-hungry industries like data centers), the ROI can become decades long.

**Green House Data purchased 25,000,000 kWh worth of RECs for 2017** from Power River Energy Corporation under the product name WyRECs, representing a reduction of 15,796 metric tons of emissions. WyRECs are unique in the market as they support not only clean energy generation but local historic preservation and investment in Wyoming communities. All RECs purchased by Green House Data are third-party certified and accepted by the EPA.

## ***1.2. Energy Efficiency***

Green House Data takes a number of measures to reduce data center energy consumption, including:

- Free cooling year-round
- Modular data center “pod” design
- Hot/cold aisle containment
- Focus on virtualization
- Energy Star equipment
- Power supply efficiency minimums
- Power and temperature measurements and tracking

Most data centers are using some form of **virtualization** these days, in which servers can run multiple virtual machines (VMs) on a single piece of hardware, using more available power and resources. This is the cornerstone of cloud computing and increases CPU utilization by 40-60%. According to VMware, virtualizing just 100 servers is the equivalent of planting 1,569 trees or taking 89 cars off the street—and a typical data center has far more than 100 servers.

As mentioned in the PUE sidebar above, **by improving our PUE we reduce our carbon emissions by as much as 1/3**, depending on the electric grid subregion (eGRID).

### 1.3 Green House Data One-for-One Program

In addition to RECs, Green House Data implemented a one-for-one program in 2016 under which each piece of marketing material ordered is paired with the planting of one tree by the Arbor Day Foundation. This includes items like branded water bottles, apparel, and other tradeshow giveaways or internal employee gifts.

The trees are planted as part of the Arbor Day Foundation’s Mississippi Alluvial Valley project. Green House Data plans to plant future trees within nearby communities to our office and data center locations. For 2017, 1,000 trees have been planted as part of the One-For-One program. Additional purchases are made biannually.

### 1.4. Facility Energy Use

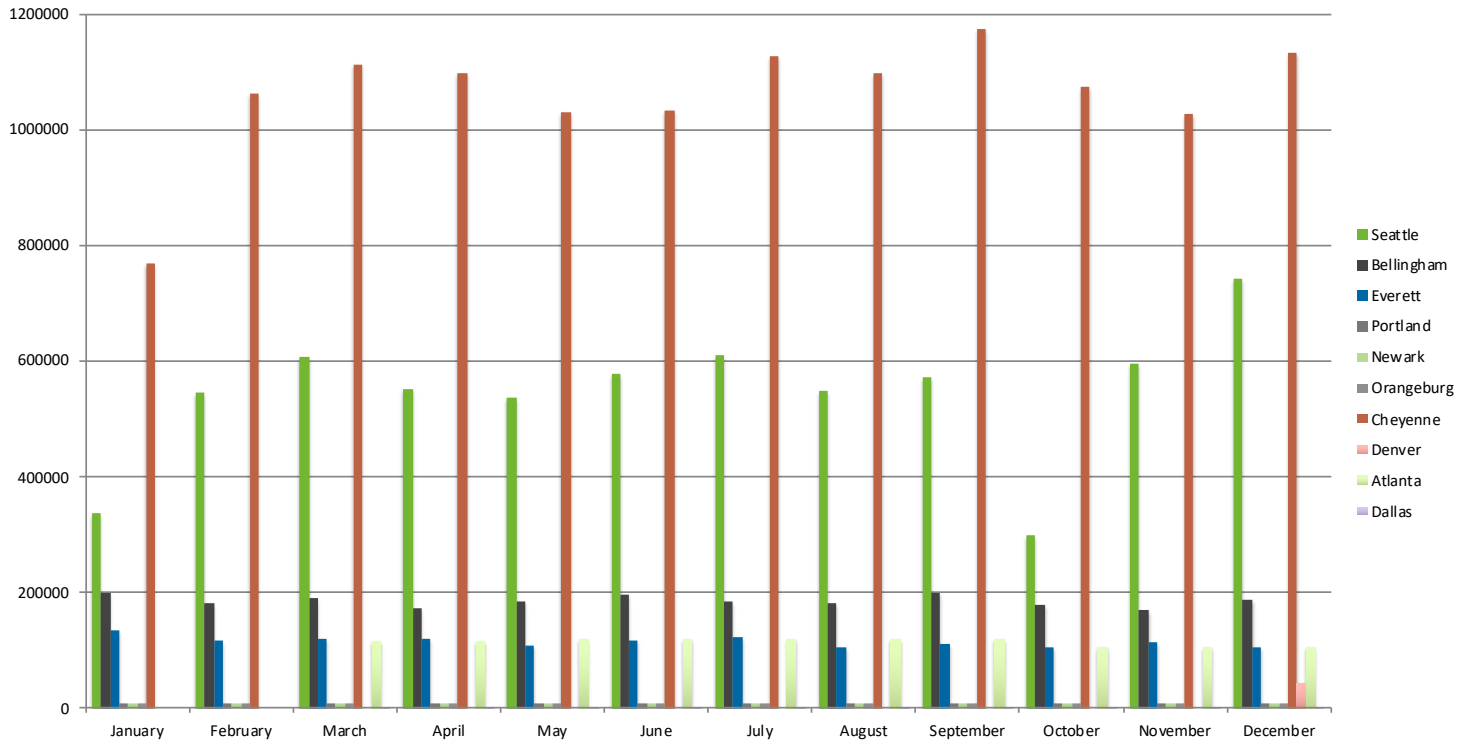
Electricity remains the top contributor to Green House Data’s carbon footprint. This is impossible to avoid within the data center industry, but we can reduce this impact through energy efficient improvements. As our facilities continue to fill up with additional clients and equipment, our electric use grows alongside.

The graphs below illustrate the overall energy consumption, as well as monthly breakdown and a comparison to the past two years.

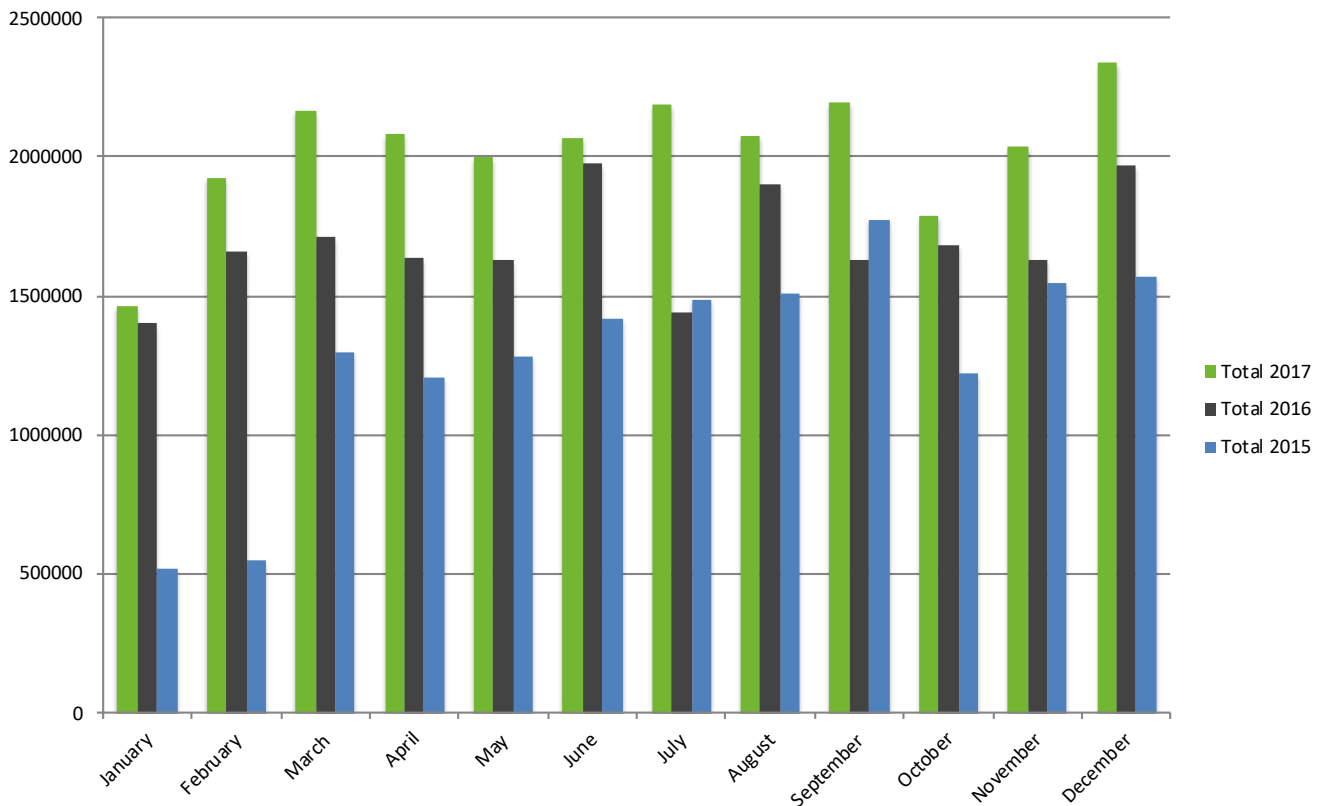
**Fig. 1: Energy Consumption From All Locations**

Location	eGrid Subregion	kWh Purchased	CO2 Emissions	CH4 Emissions	N2O Emissions
Cheyenne, WY	RMPA	12,731,750	24,148,819.5	288.5	371.9
Portland, OR	NWPP	90,720	76,438.9	1.5	1.2
Newark, NJ	RFCE	103,680	103,858.3	2.8	1.6
Denver, CO (office)	RMPA	50,861	96,469.6	1.2	1.5
Denver, CO	RMPA	42,041	79,740.3	1.0	1.2
Bellingham, WA	NWPP	2,219,967	1,870,499.8	35.6	29.0
Everett, WA	NWPP	1,369,040	1,153,525.7	22.0	17.9
Seattle, WA	NWPP	6,519,263	5,493,000.6	104.6	85.2
Atlanta, GA	SRSO	1,144,640	1,549,945.6	26.1	23.9
Dallas, TX	ERCT	21,900	26,677.9	0.4	0.3
Orangeburg, NY	NYCW	84,576	52,641.8	2.0	0.2

**Fig. 2: Energy Consumption By Month (in kWh)**



**Fig. 3: Energy Consumption, 2017 vs. 2016 vs. 2015 (in kWh)**



Electricity totals are not provided by building owners in Portland, Piscataway, or Orangeburg. Estimations were therefore made for the Piscataway and Piscataway locations by assuming a 12 kW rack density running 24/7 for the calendar year. For Portland and Orangeburg, point-in-time kW draw was measured at the time of reporting and multiplied by 24 hours a day for a full year. Denver office space energy consumption was calculated using approximate square feet and the national average consumption as described by the EIA: <https://www.eia.gov/consumption/commercial/data/2012/c&e/cfm/c13.cfm>.

### **1.5. Facility Water Use**

**Green House Data facilities and offices used a known 3,271,998 gallons of water in 2017, an increase of 362,068 gallons over 2016.** This increase is largely due to the additional workloads within our facilities, as water consumption is closely tied to HVAC systems.

We estimate an added 1,400,000 gallons in addition to this measured consumption from offices that do not receive individual water bills, as well as colocated server rooms that are using a portion of water from total facility consumption (from chillers, office areas, humidifiers, etc). These colocated facilities are in buildings owned and operated by third party entities that only include the cost of water as part of overall rent, and not as a line item.

Efforts to reduce water consumption have been made in Green House Data offices including low flow aerated faucets and zero-flush urinals, where possible.

### **1.6. Company Travel**

While the Employee Handbook does recommend limited and shared travel when possible, Green House Data owns three vehicles for on-call technicians and company errands; in addition, mileage may be expensed when personal vehicles are used on company business.

Mileage for the company light-duty truck dropped significantly in 2017; while mileage for the hybrid-electric Chevrolet Volt increased to become the majority of company travel.

**Fig. 4: Mileage Emissions**

Transport Type	CO2 (kg)	CH4 (g)	N20 (g)
Passenger Car	6,271	306.8	221.5
Light-Duty Truck	1,507	72.2	57.1
Airplane	9,202	45.4	295.4



### 1.7. Diesel Emissions

Data centers must remain online at all times, so diesel powered generators are a common fixture at the vast majority of facilities. Green House Data must purchase and burn some diesel for testing and to use up fuel that will expire on occasion.

**Green House Data only required diesel purchases in Everett, WA and Cheyenne, WY in 2016, with purchases totaling 3,048.7 gallons, with a CO2 emissions equivalent of 31 metric tons.**

### 1.8. Refrigerant Emissions

A major part of data center operations is maintaining a constant, efficient temperature for computing equipment, necessitating the purchase and maintenance of large-scale refrigeration units. While Green House Data implements a variety of energy efficient methods to minimize the amount of refrigeration required, the Data Center Operations team must still recharge the units periodically.

**In 2017, Green House Data had an inventory change of approximately 75 pounds of R-407C gas. The CO2 emissions equivalent of these gases is 60 metric tons.**

While R22 has been phased out of production in the United States due to its high Global Warming Potential, the expense involved in replacing the air conditioning units that use R22 is significant. When these units reach their end of life, or recycled R22 is no longer available, Green House Data will replace them. **In 2017, the company purchased approximately 30 pounds of R22, but was unable to find a CO2 equivalent to include in the overall Green House Gas Emissions tracking.**

### 1.9. Total Green House Gas Emissions

**Fig. 5: Net Emissions by Source**

<b>Emissions Category</b>	<b>CO2-e (metric tons)</b>
Stationary Combustion	31
Refrigeration / AC	60
Purchased and Consumed Electricity	15,796
Employee Business Travel	17
RECs and Green Power Purchases	-15,796
Offsets	0
<b>NET GHG EMISSIONS</b>	<b>109</b>

## 2. Green House Gives: Community Engagement

Green House Data encourages volunteering through corporate and personal channels, with company-organized outings, monetary and labor donations, and dedicated resources for both employees and nonprofit organizations. Employees are allowed to take 5% of their billable hours as personal time to volunteer in their communities.

### 2.1. Green House Gives Nonprofit Program

In addition, 5% of staff hours and infrastructure resources are reserved for nonprofit organizations, which receive services as part of the Green House Gives Program. This program is designed to support the launch, growth, and on-going support of social and environmental nonprofit entrepreneurs. Organizations who receive complimentary services include cybersecurity and coding camps and clubs, homeless relief, and solar power proponents.

## 3. Corporate Ethics and Transparency

Green House Data strives to operate in a transparent, ethical manner, going beyond sustainability efforts and encouraging an open and honest business environment within our offices and when dealing with customers, vendors, board members, and the public.

As part of this goal, Green House Data was certified as the first B Corp in Wyoming in 2014. B Corporations are certified by the nonprofit organization B Lab as having voluntarily met the rigorous standards of social and environmental performance, accountability, and transparency within the overall goal of redefining success in business. Green House Data joins other B Corps like New Belgium Brewing, Etsy, Renewable Choice and Patagonia. There are more than 1,800 Certified B Corporations from over 130 industries and 50 countries, representing a diverse multi-billion dollar marketplace.



Supervisors practice an open-door style of management all the way up to the CEO, who holds quarterly meetings informing the entire staff of the strategic direction of the company. Financial details including the Profit and Loss sheet are shared with employees upon request.

Green House Data governing policies and the Employee Handbook include policies preventing discrimination and child labor. Policies also encourage or enforce confidential whistleblowing, the facilitation of employee training and ongoing education, grievance resolution, and local purchasing and supplying preferences.

## 4. Data Privacy and Security

Green House Data takes strong measures to segregate and protect customer data. With audits to certify SOC 1 and 2 Type II and HIPAA compliance, the company has proven to external parties that its data security software, hardware, and employee practices are sound.

The company suffered no known data breaches in 2017 affecting customer data.

## 5. Future Goals

Goals for 2017 included the integration of Cirracore facilities and offices under the Green House Data philosophy of efficiency and conservation. This goal has been completed, but with the acquisition of Ajubeo and Assuritive, new consolidation and efficiency gains must be accomplished.

A stretch goal was better tracking of waste and recycling, which the company has not been able to implement. This goal will remain through 2018, along with the additional goals of increasing the amount of women in managerial roles, improving wage gaps between genders, and growing the One for One program to purchase additional trees.

As we build out our Cheyenne DC02 facility to capacity, we will also seek to use lessons learned from Phases 1 and 2 to improve overall energy efficiency and reduce waste.

Finally, as we recertify as a B Corp in 2018, we will seek to improve our overall certification score once again.

**Thanks for reading. This concludes the 2017 Green House Data Sustainability Report.**