

How Clean is Your Cloud?

Company Data Center Facilities and Estimates of Power Demand

Facility Location	Status	Sq Footage ¹	Estimated Max Power Demand (MW) ²	% of Dirty Energy Generation on Local Grid	% of RE Supply to Data Center	CUE ³	Coal ⁴	Nuclear ⁵	Clean Energy Index ⁶
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						0.826			
Africa						1.963			
Asia						1.256			
Europe						0.679			
North America						0.817			
South America						0.482			



							33.9%	29.9%	13.5%
Boardman, Oregon (Vadata)	Partially completed	<u>100,000</u>	4	<u>11.6% Nuclear</u>	<u>85.5%</u>				
McNary, Oregon (Vadata)	Under construction	120,000	4	<u>11.6% Nuclear</u>	<u>85.5%</u>				
Dublin, Ireland	Operational	<u>240,000</u>	12	<u>23.5% Coal</u>	<u>14.9%</u>				
Manassas, Virginia	Operational	<u>110,000</u>	17	<u>46% Coal</u> <u>41% Nuclear</u>	<u>3%</u>				
Ashburn, Virginia	Operational	<u>180,000</u>	28	<u>46% Coal</u> <u>41% Nuclear</u>	<u>3%</u>				
San Jose, California	Operational		8	<u>23.8% Nuclear</u> <u>1% Coal</u>	31.5%				
Sterling, Virginia	Operational	<u>125,000</u>	20	<u>46% Coal</u> <u>41% Nuclear</u>	<u>3%</u>				
<u>Japan</u>	Operational		5	<u>26.7% Coal</u> <u>26.7% Nuclear</u>	9.99%				
<u>Sao Paulo, Brazil</u>	Under construction		.05	2.1% Coal 2.8% Nuclear	89.04%				



							55.14%	27.8%	15.3%
Maiden, North Carolina	Phase I Operational	<u>500,000</u>	100MW (estimated 10% from onsite renewables)	<u>61.5% Coal</u> <u>38% Nuclear</u>	3.6%				
Newark, California	Operational	<u>100,000</u>	15	<u>1% Coal</u> <u>23.8% Nuclear</u>	31.5%				
<u>Prineville, Oregon</u>			31	<u>61.3% Coal</u>	9.3%				

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							20.1%	6.4%	56.3%
<u>London</u>	Operational	5,000	2	<u>32.9% Coal</u> <u>15.3% Nuclear</u>	5.9%				
<u>Quincy, Washington</u>	Operational	40,000	8	<u>14.2% Coal</u> <u>5.7% Nuclear</u>	74.24%				
<u>Halle Germany</u>	Under construction		2	<u>30.8% Coal</u>	35.2%				

							39.4%	13.2%	36.4%
<u>Lulea, Sweden</u>	Under construction		90		100%				
<u>Forest City, North Carolina</u>	Under construction		90	<u>61.5% Coal</u> <u>38% Nuclear</u>	3.6%				
<u>Prineville, Oregon</u>	Operational		90	<u>61.3% Coal</u>	9.3%				
<u>San Jose, California (Fortune)</u>	Lease	<u>25,000</u>	5	<u>23.8% Nuclear</u> <u>1% Coal</u>	31.5%				
<u>Santa Clara, California (Digital Realty Trust)</u>	Lease	<u>86,000</u>	8	<u>10% Coal</u> <u>0% Nuclear</u>	41%				
<u>Ashburn, Virginia (Digital Realty Trust)</u>	Lease	<u>49,000</u>	8	<u>46% Coal</u> <u>41% Nuclear</u>	4%				
<u>Ashburn, Virginia (Dupont Fabros)</u>	Lease	<u>45,000</u>	8	<u>46% Coal</u> <u>41% Nuclear</u>	4%				
<u>Santa Clara, California (Core Site Realty)</u>	Lease	<u>50,000</u>	8	<u>10% Coal</u> <u>0% Nuclear</u>	41%				

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							28.7%	15.3%	39.4%
Berkeley County, South Carolina	Under construction	200,000	72	78% Coal 9% Nuclear	2%				
Council Bluffs, Iowa	Under construction	200,000	72	52% Coal 7% Nuclear	100% ⁹				
Dalles, Oregon	Operational	200,000	70	11.6% Nuclear	78%				
Eemshaven, Netherlands	Operational	215,000	36	19.5% Coal 3.5% Nuclear	7.5%				
Hamina, Finland	Near completion		22	32% Nuclear 32% Coal & Peat	29%				
Lenoir, North Carolina	Operational		72	61.5% Coal 38% Nuclear	3.6%				
Mayes County, Oklahoma	Near completion		76	55% Coal	100% ¹⁰				
St Ghislain, Belgium	Operational		40	50% Nuclear 8% Coal	8%				
Dublin, Ireland	Under construction		12	23.5% Coal	14.9%				
Singapore	Under construction		14	18.8% Oil	0%				
Hong Kong	Under construction		40	54% Coal 23% Nuclear	0%				
Taiwan	Under construction		12	54% Coal 18% Nuclear	3.1%				
Douglas County, Georgia	Operational		26	62.3% Coal 22.4% Nuclear	3.6%				

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							49.7%	14.1%	19.4
Atlanta (Alpharetta), Georgia	Operational	200,000	32	62.3% Coal 22.4% Nuclear	3.6%				
Atlanta (Suwanee), Georgia	Operational	200,000	32	62.3% Coal 22.4% Nuclear	3.6%				
Austin (2)	Operational	100,000	16	31.8% Coal 27% Nuclear	10%				
Houston (2)	Operational		16	39.5% Coal 13.1% Nuclear	8.1%				
Colorado	Operational	250,000	20	66.7% Coal	5%				
Tulsa (Cherokee)	Operational	200,000	37	42% Coal	15%				
Wynyard. UK	Recently completed	305,000	19	28% Coal 18% Nuclear	100% ¹¹				

							49.5%	11.5	12.1%
Boulder. Colorado	Operational	300,000	60	51% Coal	14%				
Dublin. Ireland	Operational		3	23.5% Coal	15%				
Research Triangle. North Carolina	Operational	100,000	30	61% Coal 38% Nuclear	3.6%				
Singapore	Recently completed		2.5	18.8% Oil	0%				
New Zealand		16,000	4		37%				

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Microsoft®							39.3%	26%	13.9%
<u>Ashburn, Virginia (Dupont Fabros)</u>	Lease renewed		10	<u>46% Coal</u> <u>41% Nuclear</u>	4%				
<u>Boydton, Virginia</u>	Under construction		71	<u>46% Coal</u> <u>41% Nuclear</u>	4%				
<u>Chicago, Illinois</u>	Operational	700,000	73	<u>44% Coal</u> <u>40% Nuclear</u>	1%				
<u>Dublin, Ireland</u>	Operational	303,000	22	<u>23.5% Coal</u>	14.9%				
<u>Quincy, Washington</u>	Operational	500,000	27	<u>14.2% Coal</u> <u>5.7% Nuclear</u>	74.24%				
<u>San Antonio, Texas</u>	Operational	477,000	27	<u>34.6% Coal</u> <u>34.4% Nuclear</u>	12.3%				
<u>W Des Moines, Iowa</u>	Operational		22	<u>52% Coal</u> <u>7% Nuclear</u>	20%				

ORACLE®							48.7%	17.2%	7.1%
Austin, Texas	Operational	80,000	12	<u>31.8% Coal</u> <u>27.2% Nuclear</u>	10%				
Colorado Springs	Operational	6,900	2	<u>66.7% Coal</u>	5%				
<u>West Jordan, Utah</u>	Operational	180,000	5	<u>82% Coal</u>	1%				

rackspace® HOSTING							31.6%	22.3%	23.6%
<u>San Antonio, Texas</u>	Operational	15,000	3	<u>34.6% Coal</u> <u>34.4% Nuclear</u>	12.3%				
<u>Herndon, Virginia</u>	Operational	330,000	6	<u>46% Coal</u> <u>41% Nuclear</u>	4%				
<u>Ashburn, Virginia</u>	Operational	11,000	3	<u>46% Coal</u> <u>41% Nuclear</u>	4%				
Chicago, Illinois	Operational	36,000	6	<u>44% Coal</u> <u>40% Nuclear</u>	3%				
<u>Dallas, Texas</u>	Operational	144,000	12	<u>34.4% Coal</u> <u>12% Nuclear</u>	5%				
London, UK	Operational	6,500	2	<u>32.9% Coal</u> <u>15.3% Nuclear</u>	100% ¹²				
<u>Slough, UK</u>	Operational	65,000	10		100% ¹³				
<u>Hong Kong</u>	Operational	9,000	2	<u>49% Coal</u> <u>30.1% Nuclear</u>					

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							33.9%	31%	4%
Chicago, Illinois	Operational		4	44% Coal 40% Nuclear	3%				
Northern Virginia	Operational		3.5	46% Coal 41% Nuclear	4%				
<u>Singapore</u>	Operational		2	18.8% Oil					
<u>Tokyo</u>	Operational		2	26.7% Coal 26.7% Nuclear	9.99%				



							35.6%	12.8%	21.3%
Sacramento, California (<u>RagingWire</u>)	Lease		3	0% Coal 0% Nuclear	45%				
<u>Atlanta</u>	Lease	990,000	4	62.3% Coal 22.4% Nuclear	3.6%				



							20.3%	14.6%	56.4%
<u>Avenches, Switzerland</u>	Under construction		4	40.5% Coal 55.4% Nuclear	55.35%				
<u>Ashburn, Virginia</u> (Dupont Fabros)	Operational		10	46% Coal 41% Nuclear	4%				
<u>Lockport, New York</u>	Operational		18	27.8% Nuclear 23% Coal	92% ¹⁴				
<u>La Vista, Nebraska</u>	Operational		12	56% Coal 35% Nuclear	4.3%				
Singapore	Operational		4	18.8% Oil	0%				
Quincy, Washington	Operational		26.2	14.2% Coal 5.7% Nuclear	74.2%				

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Notes

- 1 Square footage listed is as provided or announced by company or firms building or managing the facility; or as reported by media during facility construction process.
- 2 As provided or announced by the company. If not disclosed by the company, estimated maximum power (MW) is derived from other facility information that has been disclosed, including: company reported or industry average MW of IT power demand per dollar invested; air quality permits for backup generators; estimated energy demand per square foot.
- 3 Carbon Usage Effectiveness (CUE) provides a carbon per kilowatt hour intensity measurement. CUE has been a standard for well over a year, and yet only one of the companies evaluated here, Akamai, is publicly reporting its CUE.
http://www.thegreengrid.org/Global/Content/white-papers/Carbon_Usage_Effectiveness_White_Paper
- 4 For methodology in calculating Coal percentage, please see full report, How Clean is Your Cloud?, Appendix 1
- 5 For methodology in calculating Nuclear percentage, please see full report, How Clean is Your Cloud?, Appendix 1
- 6 For methodology in calculating Clean Energy Index, please see full report, How Clean is Your Cloud?, Appendix 1
- 7 Akamai's global network of server is highly distributed and not possible to individually evaluate facilities as we have done for other brands. However, Akamai is the only company that is reporting a fleet wide and regional Carbon Utilization Effectiveness (CUE), as noted in the data center facility table.
- 8 AWS was provided facility power demand estimates to review. AWS responded they were not correct, but did not provide alternative estimates. Using conservative calculations, Greenpeace has used the best information available to derive power demand, and have decided to publish and continue to invite AWS to be transparent and provide more accurate data for their facility power demand.
- 9 Based on 20 year contract for purchase of 114MW of wind power from Iowa wind farm.
<http://googleblog.blogspot.com/2010/07/reducing-our-carbon-footprint-with.html>
- 10 Based on 20 year contract for purchase of 100.8MW of wind power from Oklahoma wind farm.
<http://googleblog.blogspot.com/2011/04/oklahoma-where-wind-comes-sweepin-down.html>
- 11 HP has purchased renewable energy sufficient to meet its UK data centers' operations.
- 12 Rackspace has purchased renewable energy sufficient to meet its UK data centers' operations.
- 13 Rackspace has purchased renewable energy sufficient to meet its UK data centers' operations.
- 14 Yahoo has secured 15MW of hydroelectric electricity supply for Lockport facility, remainder 3MW calculated based on local grid mix.