Journal of Environmental and Public Health Law

Volume 9 Issue 1
Winter 2014

Cloud Computing and the NSA: The Carbon Footprint of the Secret Servers

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INTRODUCTION

Edward Snowden took the world by storm when he exposed the data collection practices of the National Security Agency, known to many as the NSA. Much ink has been spilled on the constitutionality of such practices and the scope of its surveillance yet the cloud computing that facilitates such surveillance often goes unmentioned, if not unnoticed.

While the NSA looks to expand its operations by building a data center in Utah, referred to as Intelligence Community Comprehensive National Cybersecurity Initiative Data Center, privacy may not turn out to be our biggest issue. With cloud computing on the rise, the air of privacy may be thinning, but the expansion of data centers pose a real threat to the climate given their significant contributions to greenhouse gas emissions. The NSA's newest data center is expected to be one of the world's largest, totaling the size of approximately 17 football fields.[1] The NSA has also been looking to design a supercomputing center at its headquarters in Fort Meade, Md.[2]

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[1] *See* Steve Fidel, *Utah's $1.5 Billion Cyber-Security Center Under Way*, DESERET NEWS (Jan. 6, 2011, 1:10 AM), http://www.deseretnews.com/article/705363940/Utahs-15-billion-cyber-security-center-under-way.html.

[2] J. Nicholas Hoover, *NSA Building $896.5 Million Supercomputing Center*, INFORMATIONWEEK (Apr. 21, 2011, 1:23 PM), http://www

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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Together these massive data centers are expected to be 7 times larger than the Pentagon.[3]

Yet the NSA is not alone. Many major companies, like Google, Apple and Facebook, are also looking to expand their data centers.[4] With a carbon footprint similar to that of the airline industry,[5] data centers provide a great opportunity to reduce greenhouse gas emissions. One manner in which this could have been achieved is through the Environmental Protection Agency ("EPA") using its existing authority under the Clean Air Act to regulate both the direct and indirect greenhouse gas emissions of data centers. A recent Supreme Court case, however, limits the EPA's authority to set greenhouse gas emission limits for major stationary sources and large commercial facilities solely on the basis of emitting greenhouse gases. Yet, the EPA can still incorporate energy consumption into the design of a program to reduce the carbon pollution from existing power plants.

Alternatively, the Energy Policy Act currently offers a solution to reducing the indirect greenhouse gas emissions of federal facilities. Specifically, the Energy Policy Act mandates that federal facilities operate with certain energy conservation measures and offers various financial incentives. However, despite these financial incentives that make energy

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.informationweek.com/architecture/nsa-building-$8965-million-supercomputing-center/d/d-id/1097313.

[3] Aliya Sternstein, *The NSA's New Spy Facilities are 7 Times Bigger Than the Pentagon*, DEF. ONE (July 25, 2013), http://www.defenseone.com/technology/2013/07/nsas-big-dig/67406/.

[4] *See* Rich Miller, *Google's Data Center Building Boom Continues: $1.6 Billion Investment in 3 Months*, DATA CENTER KNOWLEDGE (July 19, 2013), http://www.datacenterknowledge.com/archives/2013/07/19/google-data-center-spending-continues-to-soar-1-6-billion-in-3-months/; *see also* Jordan Novet, *Apple Quietly Builds Its Prineville Data Center*, DATA CENTER KNOWLEDGE (Oct. 16, 2013), https://www.datacenterknowledge.com/archives/2013/10/16/apple-quietly-builds-its-prineville-data-center/.

[5] *See* Part II.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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conservation more practical, the Energy Policy Act allows for an exemption of the NSA's data centers—two of the largest data centers in the U.S.—from these requirements.

This Note will primarily focus on how the EPA can use its existing authority under the Clean Air Act to regulate both the direct and indirect greenhouse gas emissions of data centers. This Note will also address how the Energy Policy Act allows for the regulation of indirect greenhouse gas emissions of federal facilities but should be altered to remove blanket energy management requirement exemptions. Part I will elucidate the concept of cloud computing. Part II will explain the relationship between cloud computing and data centers and discuss cloud computing's significant contribution to air pollution, specifically greenhouse gases.

Part III will discuss the Clean Air Act, the EPA's recent proposal of a rule to set greenhouse gas emission limits for major stationary sources, its contemplation of incorporating energy efficiency standards for consumers of electricity into counting towards required emissions reductions by power plants, and the impact that both might have on data centers. Part IV will briefly discuss why state laws, like California's Assembly Bill 32, alone would not be sufficient to reduce the pollution caused by data centers. Finally, Part V will discuss the Energy Policy Act and why the NSA's data centers would be great prospects for energy savings performance contracts. Part V will also discuss how the Energy Policy Act currently exempts the NSA from energy management requirements and how the Energy Policy Act could be amended to address the rise of cloud computing.

PART I. WHAT IS CLOUD COMPUTING AND WHY IS IT ON THE RISE?

To the layman, cloud computing is a nebulous term that may sound like a metaphor for the Internet. To information technology (IT) professionals, cloud computing refers to "data processing operations that are outsourced to server farms" as opposed to being powered in the server room on-site of an

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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office.[6] For businesses, cloud computing might involve networks or websites that are remotely hosted, whereas for individuals, cloud computing may simply consist of digital storage, such as Google documents.[7] Cloud computing, however, is best defined as both a business model and an infrastructure.[8] It is a process in which "software and data, rather than being stored locally on [one's] own servers and computers, are delivered to [the individual user] in real time via the Internet."[9]

Cloud computing is best illustrated by the following example: imagine you work for a business in which a project requires that several team members interact with the same file. The computing model used by your company can save lots of time, money, and storage space. Consider Microsoft Office, which has traditionally offered a client server model of computing, in which your business would "buy[] its own servers and workstations, purchase[] expensive software licenses for everything from file sharing to e-mail services to word processing, and hire[] IT staff to keep everything running."[10] The inevitable issue of multiple versions of the same document and having to send the documents back and forth would arise. There would also be the hassle of trying to consolidate and delete these documents. The

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[6] Ellen M. Gilmer, *Is There a Silver Lining for the Environment in 'Cloud Computing'*?, N.Y. TIMES, Aug. 10, 2011, http://www.nytimes.com/cwire/2011/08/10/10climatewire-is-there-a-silver-lining-for-the-environment-88104.html?pagewanted=all.

[7] *Id*.

[8] Jack Newton, *Is Cloud Computing Green Computing*?, 27 GPSOLO 28, 29 (2010).

[9] *Id*.

[10] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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issue of finding a place to store the digital documents yet still make them accessible as needed would also prove both timely and costly.[11]

On the other hand, your business could use cloud computing, like that of Google—"one of the pioneers of modern-day cloud computing."[12] In other words, "[r]ather than hosting e-mail and file servers on-premise, running database servers, and purchasing myriad software licenses, [your business could] simply use Google's products—such as Gmail and Google Docs—through a web browser."[13] This would effectively eliminate the issue of having duplicates. In fact, several people could simultaneously work on the same document and it would be updated in real time. Additionally, the files could be accessed from anywhere with an Internet connection and would require little to no storage space on your computer. Even better, using this method would require little to no costs.

The cost-efficiency of cloud computing is an enticing paradigm for any business enterprise looking to reshape its business model.[14] First, a service provider need not "invest in the infrastructure to start gaining benefit from cloud computing" because cloud computing uses a usage-based pricing model in which the service provider rents usage according to its actual need.[15] For example, when Apple first launches a new operating system, Apple's website will receive lots of hits—this is known as peak usage. Eventually, however, the website's traffic will plateau and whatever usage was purchased but not

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[11] *See* Jason Krause, *Virtual Storage: The Old, Gray File Cabinet Ain't What It Used to Be*, 90 A.B.A. J. 58 (2004) (discussing the benefits of virtual storage and the perpetual problem of storage options for law firms).

[12] Newton, *supra* note 8, at 29.

[13] *Id*.

[14] *See* Qi Zhang et al., *Cloud Computing: State-of-the-Art and Research Challenges*, 1 J. INTERNET SERVICES & APPLICATIONS 7, 7 (2010), *available at* http://it341.blog.com/files/2012/12/Cloud-computing-state-of-the-art-and-research-challenges.pdf.

[15] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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used will go to waste. Before cloud computing, the left over capacity (the extra usage from an over-prediction) would go to waste so the company would lose money.[16]

Second, cloud computing lowers operating costs because the cloud's resources can be "allocated and de-allocated on demand."[17] For example, in the example used above, the leftover usage would simply go to another client server that needs it and Apple would not be charged for what was not used. Thus, the cloud "provides huge savings since resources can be released to save on operating costs when service demand is low."[18] Third, the infrastructure of the cloud makes it highly scalable, which means that service providers can easily expand to accommodate rapid increase in service demands.[19] Since the services are web-based, the cloud makes it accessible from various devices—from desktops to cell phones.[20] Finally, the cloud allows businesses to reduce risks and eliminate maintenance expenses because instead of hiring IT staff, the cloud allows the service provider to shift the burden and business risk onto a third party who is better equipped to deal with the risks and issues that arise with hardware failure and hardware maintenance.[21]

PART II. CLOUD COMPUTING SIGNIFICANTLY CONTRIBUTES TO GLOBAL GREENHOUSE GAS EMISSIONS DUE TO ITS MASSIVE DATA CENTERS

At the heart of cloud computing are massive data centers. A data center is a facility used to store and maintain computer systems and related equipment such as servers, switch routers, load balancers, data storage

[16] *See* Gilmer, *supra* note 6.

[17] Zhang et al., *supra* note 14, at 7.

[18] Gilmer, *supra* note 6.

[19] *See* Zhang et al., *supra* note 14, at 7.

[20] *Id*. at 8.

[21] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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devices, and other associated components.[22] Data centers eliminate the need for on-site server rooms in every office and are "responsible for managing the physical resources of the cloud" by essentially "creat[ing] a pool of storage and computing resources" that allows for the remote storage, processing, and dissemination of vast amounts of data.[23]

Four of five of the world's largest data centers are located in the United States.[24] The world's second largest data center, Switch SuperNAP, which currently is "[t]he world's largest operating data 'campus[,]' is situated in southern Nevada" and is approximately 2.2 million square feet—the size of approximately 38 football fields.[25] The world's largest data center, located in Langfang, China, expected to be complete in 2016, will be nearly 3 times as large.[26]

Unsurprisingly, these data centers consume vast amounts of electricity and indirectly contribute to global warming because they are amongst the largest consumers of electricity generated from burning fossil fuels that emit greenhouse gases. In fact, a single data center is capable of consuming "more power than a medium-sized town."[27] In 2006, data centers constituted approximately 1.5% of the total amount of electricity consumed by the

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[22] *Id.* at 11; *see also Definition of Data Center*, DATA CENTER ENERGY MGMT., http://hightech.lbl.gov/dctraining/ definitions.html (last visited Apr. 5, 2014).

[23] Zhang et al., *supra* note 14, at 9–11.

[24] *See The 5 Largest Data Centers In The World*, FORBES.COM, http://www.forbes.com/pictures/fhgl45ijg/range-international-information-hub/ (last visited Apr. 5, 2014).

[25] *Id*.

[26] *Id*.

[27] James Glanz, *Power, Pollution and the Internet*, N.Y. TIMES, Sept. 22, 2012, http://www.nytimes.com/2012/09/23/technology/data-centers-waste-vast-amounts-of-energy-belying-industry-image.html?_r=0.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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U.S.[28]—"similar to the amount of electricity consumed by approximately 5.8 million average U.S. households[.]"[29] During this time, "[f]ederal servers and data centers alone account[ed] for approximately . . . 10[%] . . . of this electricity use, for a total electricity cost of about $450 million annually."[30]

Much of the energy consumed by data centers is used for secondary support, like environmental controls to control cooling and overheating systems and backup generators.[31] The expense of cooling and powering is estimated to "account[] for 53% of the total operational expenditure of data centers."[32] Yet, much of the energy consumed by data centers is wasted. "Idle-energy waste is compounded by losses in the power delivery and cooling infrastructure, which increase power consumption requirements by 50-100%."[33]

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[28] Bo Li et al., *EnaCloud: An Energy-saving Application Live Placement Approach for Cloud Computing Environments*, *in* 2009 IEEE INTERNATIONAL CONFERENCE ON CLOUD COMPUTING 17, 17 (2009).

[29] U.S. Envtl. Prot. Agency, *Report to Congress on Server and Data Center Energy Efficiency Public Law* 109-431, 7 (2007), *available at* http://www.energystar.gov/ia/partners/prod_development/downloads/EPA_Datacenter_Report_Congress_Final1.pdf.

[30] *Id*.

[31] *See* Glanz, *supra* note 27; *see also* Mark Golden, *Data Centers Can Slash CO_2 Emissions 88% or More*, Article in *Precourt Institute for Energy*, STAN. UNIV. (July 19, 2013), https://energy.stanford.edu/news/data-centers-can-slash-co2-emissions-88-or-more.

[32] Zhang et al., *supra* note 14, at 15.

[33] David Meisner et al., *PowerNap: Eliminating Server Idle Power*, *in* ASPLOS XIV: PROCEEDINGS OF THE 14TH INTERNATIONAL CONFERENCE ON ARCHITECTURAL SUPPORT FOR PROGRAMMING LANGUAGES AND OPERATING SYSTEMS 205, 205 (2009), *available at* http://web.eecs.umich.edu/~twenisch/papers/asplos09.pdf.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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In 2005, the Natural Resources Defense Council released data indicating that idle servers, even with a power management function enabled, make up 69–97% of the total annual energy consumed by data centers.[34] On average, a data center only uses 6–12% of the "electricity powering their servers to perform computations."[35] More recent data suggests that most data centers operate at merely 3 to 5% of their maximum capacity.[36] The overconsumption is largely due to an exaggerated fear of power outages, which pose the threat of loss of business.[37] Much of this power is used to safeguard against "a grid failure as brief as a few hundredths of a second, an interruption that could crash the servers."[38] Prior to the recent concern for energy efficiency, "a typical processor in a server farm environment would be

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[34] Noah Horowitz, *Recommendations for Tier I ENERGY STAR Computer Specification, Natural Resources Def. Council* (2005), *available at* http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/computer/RecommendationsTierICompSpecs.pdf; Newton, *supra* note 8, at 29 (A study conducted by the consulting firm McKinsey & Company found that "nearly 30 percent of servers worldwide are not used at all" but continue consuming energy.); *see also Industry Perspectives, Taking a Truly Holistic View of Data Center Efficiency*, DATA CENTER KNOWLEDGE (Nov. 18, 2013), http://www.datacenterknowledge.com/archives/2013/11/18/taking-truly-holistic-view-data-center-efficiency/ ("An idle server that is doing nothing at all can still draw 60 percent of its maximum power.").

[35] Glanz, *supra* note 27.

[36] *See* Golden, *supra* note 31.

[37] Glanz, *supra* note 27; *see also* EMERSON NETWORK POWER, 2013 STUDY ON DATA CENTER OUTAGES 8 (2013), *available at* http://www.emersonnetworkpower.com/documents/en-us/brands/liebert/documents/white%20papers/2013_emerson_data_center_outages_sl-24679.pdf.

[38] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

utilized just 10[%] of the time, but it would constantly have electricity flowing through it."[39]

In addition to wasting vast amounts of energy "[t]o guard against a power failure," data centers rely on "banks of generators that emit diesel exhaust."[40] In some places, data center pollution "has increasingly been cited by [state] authorities for violating clean air regulations[.]"[41] For example, "[i]n Silicon Valley, many data centers appear on the state government's Toxic Air Contaminant Inventory, a roster of the area's top stationary diesel polluters."[42] All in all, cloud computing, both directly and indirectly, contributes about 2% of global greenhouse gas emissions with carbon dioxide emissions comparable to that of the airline industry.[43]

Nevertheless, cloud computing will "represent more than two-thirds of global data center traffic by 2017 and will have grown more than fourfold

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[39] Dan Holden, *Stanford Study: Emphasis on Renewable Energy for IT is Misplaced*, SV411 (July 22, 2013), http://www.sv411.com/index.php/2013/07/stanford-study-emphasis-renewable-energy-it-misplaced/.

[40] *Id*. Generally speaking, most data centers use diesel fuel over natural gas because it is more cost effective. Diesel fuel provides a better performance for energy per unit of fuel, a decreased risk of fires (natural gas often runs the risk of "potential explosions if gas line is ruptured"), can operate for prolonged periods of time in the wake of a disaster, and is more cost effective. *See also* Paul Kirvan, *Diesel vs. natural gas generator for data center disaster readiness*, SEARCHDISCOVERYRESEARCH (Mar. 8, 2013), http://searchdisasterrecovery.techtarget.com/answer/Diesel-vs-natural-gas-generator-for-data-center-disaster-readiness.

[41] Glanz, *supra* note 27.

[42] *Id*.

[43] *See* Umair Irfan, *Technology: Internet Is a Growing Source of Emissions, Comparable to Airlines*, E&E PUBL'G (Jan. 9, 2013), *available at* http://www.eenews.net/climatewire/stories/1059974502/print.

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http://pjephl.law.pitt.edu

from 2012 to 2017."[44] By 2020, cloud computing is expected to reach twice the current total global emissions output of the United Kingdom as well as exceed the carbon footprint of the airline industry.[45]

PART III. THE EPA USING ITS EXISTING AUTHORITY UNDER THE CLEAN AIR ACT CAN REGULATE BOTH THE DIRECT AND INDIRECT GREENHOUSE GAS EMISSIONS OF DATA CENTERS

In light of these findings, lack of an environmental regulation remains the elephant in the room. If data centers have such a large carbon footprint, then why are they not regulated by the Clean Air Act ("CAA")? Congress enacted the CAA to combat the increase in the complexity and amount of air pollution caused by increasing motor vehicle use, industrial development, and urbanization that has resulted in accumulating hazards to the health and welfare of the public.[46] The CAA mandates the EPA to set National Ambient Air Quality Standards for six of the most commonly found air pollutants (also referred to as "criteria pollutants") that pose harm to public and environmental health.[47] These criteria pollutants are ozone, carbon monoxide, particulate matter, lead, sulfur dioxide, and nitrogen oxide.[48] These pollutants are labeled "criteria" pollutants because the EPA "regulates them by developing human health-based and/or environmentally-based criteria

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[44] Joe McKendrick, *Cloud To Dominate Data Center Traffic Within The Year, Cisco Study Predicts*, FORBES.COM (Oct. 15, 2013, 12:05 PM), http://www.forbes.com/sites/joemckendrick/2013/10/15/cloud-to-dominate-data-center-traffic-within-the-year-cisco-study-predicts/.

[45] Newton, *supra* note 8, at 29; U.S. GEN. SERVICES ADMIN. & U.S. DEPARTMENT OF ENERGY'S FED. ENERGY MGMT. PROGRAM, A QUICK START TO ENERGY EFFICIENCY (2008), *available at* http://hightech.lbl.gov/documents/data_centers/Quick-Start-Guide.pdf.

[46] 42 U.S.C. § 7401(a)(2) (2012).

[47] *What Are the Six Common Air Pollutants*?, U.S. ENVTL. PROTECTION AGENCY, http://www.epa.gov/air/urbanair/ (last visited on Feb. 27, 2014).

[48] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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(science-based guidelines) for setting permissible levels."[49] Greenhouses gases were not originally a part of this list despite a growing concern for their effect on the environment.

A. ORIGINAL SCOPE OF THE CLEAN AIR ACT

The CAA was adopted to abate the increase in pollution caused by new stationary sources (i.e., industrial plants, power plants, etcetera) or existing stationary sources undergoing modifications that result in the increase of pollution, as well as pollution caused by an increase in mobile sources like motor vehicle use.[50] Emission standards for "new facilities and for modifications that increase the emission rate of existing facilities" for pollutants that pose substantial risk to public health or welfare, including greenhouse gases, are set by the EPA.[51] These "new source performance standards" (NSPS) normally only apply to major new or modified stationary sources in certain high-emission industries such as electric utility steam-generating units, manufacturing plants, petroleum refineries, and other sources,[52] but on occasion "have been issued for smaller equipment such as wood stoves."[53] In addition to being triggered by individual sources that are

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[49] *Id*.

[50] U.S. ENVTL. PROT. AGENCY, THE CLEAN AIR ACT IN A NUTSHELL: HOW IT WORKS 1 (2013), *available at* http://www.epa.gov/air/caa/pdfs/CAA_Nutshell.pdf [hereinafter CAA IN A NUTSHELL].

[51] *Id*. at 9.

[52] STEVEN FERRY, ENVIRONMENTAL LAW: EXAMPLES & EXPLANATIONS 191 (Vicki Bea et al. eds., 6th ed. 2013). The United States Environmental Protection Agency provides a complete list of all NSPS. *See 40 CFR Part 60—New Source Performance Standards (NSPS)*, U.S. ENVTL. PROT. AGENCY http://yosemite.epa.gov/r9/r9nsps.nsf/ViewStandards?ReadForm (last updated Apr. 7, 2014) [hereinafter *New Source Performance Standards*].

[53] CAA IN A NUTSHELL, *supra* note 50, at 9.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

considered major new or modified stationary sources, NSPS only apply to direct emitters of pollutants.[54]

Under the CAA, a "stationary source" is defined as "any building, structure, facility, or installation, which emits or may emit any air pollutant."[55] A "modification" is defined as "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted."[56] New stationary sources are required to be constructed with the best available technology to reduce certain air pollutants, but a more flexible and less stringent standard is permitted for existing sources.[57] Manufactures of motor vehicles are required to decrease exhaust emissions by installing catalytic converters, a pollution control device, on motor vehicles from 1975 and later to ensure that such vehicles meet federal standards.[58]

B. *MASSACHUSETTS V. EPA*: EXPANSION OF THE APPLICATION OF THE CLEAN AIR ACT

In *Massachusetts v. EPA*, the Supreme Court held that the CAA's definition of air pollutant is sweeping and unambiguous in that it includes "any air pollution agent or combination of such agents, including any physical, chemical . . . substance or matter which is emitted into or otherwise enters the ambient air . . . ."[59] The Court noted that the "EPA has been

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[54] *See* FERRY, *supra* note 52, at 191.

[55] 42 U.S.C. § 7411(a)(3) (2012).

[56] *Id*. § 7411(a)(4).

[57] CAA IN A NUTSHELL, *supra* note 50, at 1.

[58] U.S. ENVTL. PROT. AGENCY, WHAT YOU SHOULD KNOW ABOUT USING, INSTALLING, OR BUYING AFTERMARKET CATALYTIC CONVERTERS 1 (1986), *available at* http://www.epa.gov/otaq/cert/factshts/catcvrts.pdf.

[59] Massachusetts v. EPA, 549 U.S. 497, 528–29 (2007) (citing 42 U.S.C. § 7602(g) (2012)).

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

charged with protecting the public's 'health' and 'welfare'" and the EPA's judgment on which pollutants to regulate must "relate to whether an air pollutant 'causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare[.]'"[60] The Court held that the EPA could only avoid regulating greenhouse gases "only if it determine[d] that greenhouse gases do not contribute to climate change or if it provide[d] some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do."[61] Thus, the Court held that the EPA has the statutory authority to regulate greenhouse gases from mobile sources because "greenhouse gases fit well within the Clean Air Act's capacious definition of 'air pollutant[.]'"[62] Four years later, in *American Electric Power v. Connecticut*, the Supreme Court held that the EPA also has the authority to regulate greenhouse gases from stationary sources.[63]

After the Supreme Court's decision in *Massachusetts v. EPA*, the EPA examined evidence to determine whether or not there was a basis for an endangerment finding and "cause or contribute findings under the CAA."[64] An endangerment finding would mean that "[t]he Administrator finds that the current and projected concentrations . . . [of greenhouse gases] in the atmosphere threaten the public health and welfare of current and future generations[.]"[65] Similarly, a cause or contribute finding would mean that

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[60] *Id*. at 532–33 (citing 42 U.S.C. § 7521(a)(1) (alterations in original)).

[61] *Id*. at 533.

[62] *Id*. at 532.

[63] Am. Elec. Power Co. v. Connecticut, 131 S. Ct. 2527, 2537–39 (2011).

[64] *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66, 496–97 (Dec. 15, 2009) (to be codified at 40 C.F.R. ch. 1).

[65] *Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/climatechange/endangerment/ (last updated Nov. 22, 2013).

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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"[t]he Administrator finds that the combined emissions of . . . [greenhouse gases] contribute to the greenhouse gas pollution which threatens public health and welfare."[66]

In addition to its own examination of scientific and technical evidence, the EPA received approximately 370,000 comments from the public and various environmental scientists, agencies, and organizations.[67] About two-thirds of those comments were supportive of an endangerment finding and "generally encouraged the Administrator both to make a positive endangerment determination and implement greenhouse gas emission regulations."[68] Many of the comments that opposed the findings did so "on economic grounds (e.g., due to concern for regulatory measures following an endangerment finding) or [took] issue with the proposed finding that atmospheric greenhouse gas concentrations endanger public health and welfare."[69]

Consequently, the EPA proposed a rule to set emission limits on greenhouse gases from major stationary sources and large commercial facilities.[70] The final rule set a standard for emissions of greenhouse gases at more than 100,000 tons per year for a new facility and 75,000 tons per year or more for any modification to existing facilities that would increase greenhouse gas emissions.[71] If a source exceeded these limits the source

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[66] *Id*.

[67] *Id*. at 25.

[68] *Id*.

[69] *Id*.

[70] JOSEPH MANGINO, PREVENTION OF SIGNIFICANT DETERIORATION AND TITLE V GREENHOUSE GAS TAILORING RULE (2010), *available at* http://www.epa.gov/apti/video/TailoringRule/tailoring.pdf; *see also Am. Elec. Power*, 131 S. Ct. at 2530 (holding that the CAA gives the EPA the authority to set greenhouse gas emissions on domestic power plants).

[71] U.S. ENVTL. PROT. AGENCY, FINAL RULE: PREVENTION OF SIGNIFICANT DETERIORATION AND TITLE V GREENHOUSE GAS TAILORING

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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would have been required to obtain a permit that would require the facility to apply the best available control technology for their greenhouse gas emissions.[72] These standards would only include the nation's largest direct emitters such as petroleum refineries, power plants, and cement plants.[73] Presumably, some of the nation's largest data centers would have fallen within the scope of this rule. The Supreme Court recently decided in *Utility Air Regulatory Group. v. Environmental Protection Agency* that the Clean Air Act does not require or permit the EPA to set emission limits on stationary sources that solely emit greenhouse gases, without emitting any additional criteria pollutants.[74]

C. KEEPING UP WITH CLOUD COMPUTING: PROPOSED APPLICATIONS OF THE CLEAN AIR ACT

1. INCORPORATING GREENHOUSE GAS EMISSION STANDARDS INTO THE CLEAN AIR ACT

Although data centers traditionally have not been regulated by the CAA, the final rule promulgated under the CAA in which the EPA set an emissions limit for greenhouse gases of major stationary sources would have allowed for the regulation of major data centers.[75] In deciding how to regulate greenhouse gases, the EPA looked to many of the major sources that were

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RULE 2 (2011), *available at* http://www.epa.gov/nsr/documents/20100413fs.pdf (discussing the Tailoring Rule that deals with the CAA permitting programs) [hereinafter TAILORING RULE]; *see also* Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 40 C.F.R pts. 51, 52, 70, 71, *available at* http://www.epa.gov/nsr/documents/20100413final.pdf.

[72] TAILORING RULE, *supra* note 71, at 2.

[73] *Id*. at 2.

[74] Util. Air Regulatory Grp. v. EPA, 134 S. Ct. 2427, 2422 (2014).

[75] The EPA's permit provisions were recently challenged in the Supreme Court. *See id.*

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

already being regulated because of their criteria pollutant emissions.[76] Data centers did not emit any of the criteria pollutants. In fact, many of these data centers did not themselves emit any pollutants at all. Yet, given the rise in cloud computing, today massive facilities house servers. Some of these facilities are the size of warehouses, consuming large quantities of energy, and use diesel generators.[77] As a result, major data centers not only consume large amounts of energy but also now emit significant amounts of greenhouse gases. Thus, today, data centers should fit within the meaning of the stationary sources that would trigger the greenhouse gas emissions limit and the EPA, under the CAA, should have the authority to regulate them.

For example, Google reported its greenhouse gas emissions, something data centers are not required to do, at 1.46 million metric tons in 2010. Presumably Google would fall within the major source category if any one of its data centers emitted over 100,000 tons per year of greenhouse gas emissions or 75,000 tons per year were it to make any slight expansion.[78] At 1.46 million metric tons Google would already be emitting more greenhouse gases than the 100,000 tons per year allowed by any new facility, but in order for an existing facility like one of Google's existing data centers to trigger the regulation Google would have had to make a modification to its facility. Similarly, companies like Apple and Facebook might similarly constitute significant sources of greenhouse gases with emissions that trigger the statutory limits. In 2012, Apple's carbon footprint was 30.9 million metric

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[76] Realizing that many small sources emit greenhouse gases and would be required to get PSD permits, the EPA tailored its rule to only cover the largest commercial facilities. *See* TAILORING RULE, *supra* note 71, at 2.

[77] *See Toxic Air Contaminant Control Program Annual Report*, BAY AREA AIR QUALITY MGMT. DIST., http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx (last updated July 31, 2012).

[78] *See* Dana Hull, *Google Reveals its Global Electricity Consumption and Greenhouse Gas Emissions*, SAN JOSE MERCURY NEWS (Sept. 8, 2011, 9:00 AM), http://www.mercurynews.com/ci_18852090.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

tons,[79] while Facebook's carbon footprint was 384,000 thousand metric tons.[80] With Apple looking to expand its Oregon data center,[81] which is currently 338,000-square-feet, it would certainly constitute a modification that increases the emissions rate of an existing facility—possibly enough to trigger the proposed greenhouse gas emissions limit.

Likewise, the NSA's facilities are nearly three times as big as Apple's facility. The NSA's Utah data center constitutes a new facility presumably emitting greenhouse gases of more than 100,000 tons per year and the NSA's Maryland data center is undergoing an expansion that would likely bring the facility within the scope of the EPA's rule. All in all, the CAA would have been one possible solution to regulating the direct greenhouse gas emissions of massive data centers.

2. INCORPORATING ENERGY EFFICIENCY INTO THE CAA

Even if the regulatory structure is modified to recognize direct emissions for greenhouse gases of major stationary sources like data centers, some data centers would still be beyond the scope of the CAA because even a data center generating electricity on-site using a diesel generator would have to fall within the definition of major new or modified stationary sources in order for NSPS to apply. First, such standards are only triggered by sources considered to be major new or modified stationary sources and generally only in certain high-emission industries and some data centers do not fall within

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[79] *The Story Behind Apple's Environmental Footprint*, APPLE, https://www.apple.com/environment/our-footprint/ (last visited Apr. 7, 2014).

[80] *Sharing Our Footprint*, FACEBOOK (June 27, 2013, 1:29 PM), https://www.facebook.com/notes/green-on-facebook/sharing-our-footprint/666796753335584.

[81] Mikey Campbell, *Apple reportedly looking to double size of Oregon data center*, APPLE INSIDER (Sept. 24, 2013, 2:07 PM), http://appleinsider.com/articles/13/09/24/apple-reportedly-looking-to-double-size-of-oregon-data-center.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

any of these categories.[82] Second, some of these data centers themselves are not individual sources of greenhouse gas emissions. These data centers are merely consumers of vast amounts of energy.[83] Therefore, while the EPA would have the authority to regulate the energy generating plant that powers these data centers, it would still lack the authority to directly regulate such data centers due to the fact that they do not emit greenhouse gases.

For those data centers that consume vast quantities of energy but do not emit enough greenhouse gases to trigger the CAA or do not emit greenhouse gases at all, the CAA currently does not provide any redress in minimizing their roles in climate change but robust discussions are underway regarding ways in which the EPA can incorporate energy efficiency into the CAA.[84] For example, Harvard Law School's Environmental Policy Initiative recently published a paper[85] positing that Section 111 of the CAA authorizes the EPA to define a "best system of emission reductions" and thus is flexible enough to allow the EPA to incorporate energy efficiency standards for consumers of

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[82] *See* 42 U.S.C. § 7411; *see also New Source Performance Standards*, *supra* note 52.

[83] Glanz, *supra* note 27; Li et al., *supra* note 28, at 17.

[84] *See* DANIEL A. LASHOF ET AL., CLOSING THE POWER PLANT CARBON POLLUTION LOOPHOLE: SMART WAYS THE CLEAN AIR ACT CAN CLEAN UP AMERICA'S BIGGEST CLIMATE POLLUTERS 15–17 (2012), *available at* http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf; *see also EPA Should Count Energy Efficiency Toward Standards For Existing Power Plants*, ALLIANCE TO SAVE ENERGY (Dec. 5, 2013), http://www.ase.org/resources/epa-should-count-energy-efficiency-toward-standards-existing-power-plants.

[85] Kate Konschnik & Ari Peskoe, *Efficiency Rules: The Case for End-Use Energy Efficiency Programs in the Section 111(d) Rule for Existing Power Plants* 3 (Mar. 3, 2014), http://blogs.law.harvard.edu/environmentallawprogram/files/2013/03/The-Role-of-Energy-Efficiency-in-the-111d-Rule.pdf [hereinafter *Efficiency Rules*].

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

electricity as counting towards required emissions reductions by power plants.[86] Section 111 provides:

> a standard for emissions of air pollutants which reflects *the degree of emission limitation achievable through the* application of the *best system of emission reduction which* (taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements) the *Administrator determines has been adequately demonstrated*.[87]

Since the Clean Air Act does not define the "best system of emission reduction," Section 111 does not limit the EPA's emission reduction measures to those only implemented at a facility or source.[88] Thus, Section 111 does not limit the EPA to setting performance systems of emission reduction to only what occurs at a power plant.[89] The paper also argued that Section 111 of the CAA references Section 110, "which contemplates the use of 'economic incentives such as fees, marketable permits, and auctions of emissions rights.'"[90]

Moreover, the electric generation system is so integrated because the "electricity grid is a system of interconnected generators and consumers" that it "supports consideration of the entire system when setting performance standards."[91] Energy efficiency would have a direct effect on emission reductions because "electricity generators operate only to meet their

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[86] *Id*.

[87] *Id*.

[88] *Id*.

[89] *Id*.

[90] *Id*. at 3–4.

[91] *Id*. at 4.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

consumers' demand[.]"[92] Although many industries work this way, electricity generators are unique because other industries can be regulated with technology controls. For example, scrubbers are pollution control devices that are used to remove certain gases and particulates from the exhaust of industrial plants.[93] There is, however, no proven adequate technology that can control the greenhouse gas emissions from electricity generators. Thus, the only way to reduce the greenhouse gas emissions from electricity generation is through energy efficiency or to reduce the amount of fossil fuel that is being burned in the first place.

Under Section 111 of the CAA, the EPA has the authority to regulate "energy consumption at the point of electricity consumption."[94] Accordingly, if the EPA is to consider energy consumption as part of its contemplation in the design of a program to reduce the carbon pollution from existing power plants,[95] data centers, being amongst the largest consumers of electricity, provide a great opportunity to significantly cut down on greenhouse gas emissions.[96]

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[92] Benjamin Longstreth, *Harvard Law School Report Affirms Energy Efficiency Can Be Part of Clean Air Act Standards for Power Plants*, SWITCHBOARD (Mar. 5, 2014), http://switchboard.nrdc.org/blogs/ddoniger/harvard_law_school_report_affi.html.

[93] *Sulfur Dioxide Scrubbers*, DUKE ENERGY, http://www.duke-energy.com/environment/air-quality/sulfur-dioxide-scrubbers.asp (last visited Apr. 7, 2014).

[94] *Efficiency Rules*, *supra* note 85, at 6.

[95] *Considerations in the Design of a Program to Reduce Carbon Pollution from Existing Power Plants*, U.S. ENVTL. PROT. AGENCY (Sept. 23, 2013), *available at* http://www2.epa.gov/sites/production/files/2013-09/documents/20130923statequestions.pdf.

[96] *See supra* Part II.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

PART IV. STATE LAWS ALONE WOULD BE INSUFFICIENT TO REDUCE THE GREENHOUSE GASES OF DATA CENTERS

State laws might appear to offer a solution for regulating the greenhouse gas emissions of data centers, but state laws alone would likely be insufficient. For example, a state could regulate the electrical generating plants providing energy to the data centers, which in turn would reduce indirect emissions from data centers. California has taken this route with its Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, which is meant to prepare and implement "a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions from sources or categories of sources of greenhouse gases by 2020[.]"[97] AB 32 mandates "the reduction of statewide greenhouse gas . . . emissions to 1990 levels by 2020" and authorizes "a wide range of methods (rules, regulation, orders, emission limitations, emissions reduction measures, or market-based compliance mechanisms) to achieve the statewide target."[98]

AB 32 is intended to create an incentive for major sources of greenhouses gas emissions to procure fewer allowances in the market.[99] Major sources of greenhouse gases are encouraged to "find cost-effective ways to reduce [greenhouse gases,] . . . buy more allowances if they need to[,] and/or . . . buy offset credits[.]"[100] With a cap-and-trade program that applies to all major carbon sources responsible for 85% of California's greenhouse gas emissions such as power plants, refineries, transportation

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[97] CAL. HEALTH & SAFETY CODE § 38561 (West, Westlaw through Ch. 403 of 2014 Legis. Sess.).

[98] *Assembly Bill 32 At-a-Glance*, PG&E, http://www.pge.com/en/mybusiness/save/rebates/bybusiness/ab32/index.page (last visited Sept. 21, 2014).

[99] *Id*.

[100] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

fuels, and industrial facilities,[101] AB 32 amounts to a technology-forcing standard for data centers.

Ultimately, AB 32 gives data centers an ultimatum of: significantly higher electricity bills or greater energy efficiency in its use of electricity.[102] The spike in the cost of electricity bills is due to the fact that energy costs will be more reflective of greenhouse gas emissions—"incurring costs associated with cap-and-trade[.]"[103] Thus, if prices reflect greenhouse gas emissions then efficiency will be more economical.

While AB 32 offers a great start at a solution for regulating the greenhouse gas emissions of data centers, state laws alone would be insufficient. Solely using state laws as the solution would require states to take the initiative and adopt more stringent emission standards. Some states adopting more stringent emission standards while other states do not might result in a race to the bottom. Data centers might just avoid states with the more stringent emission standards and locate in the states with the less stringent standards. Thus, states might begin to compete by loosening or simply not adopting stringent standards to attract business. A race to the bottom scenario would defeat the purpose of reducing the greenhouse gas emissions of data centers because rather than cut down on their greenhouse gas emissions, the data centers would just pollute within another state's lines. To avoid the race to the bottom a federal regulatory floor would be needed.

Another issue that might arise from a bill like AB 32 is that data centers facing higher electricity bills might simply pass the cost onto customers rather than become more efficient. Finally, smaller business might be at an

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[101] *Id*.

[102] Robert J. Mullins, *New global warming rules put the heat on data centers: California greenhouse gas law could mean higher electric bills for inefficient data centers*, NETWORK WORLD (Aug. 26, 2013, 6:01 AM), http://www.networkworld.com/news/2013/082613-data-center-rules-273102.html.

[103] *Assembly Bill 32 At-a-Glance*, *supra* note 98.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

economical disadvantage because they may not be able to afford replacing all of their current servers with more energy efficient technology. The economic hit to smaller businesses might be eliminated by either defining the scope of the facilities intended to be regulated as not to include smaller data centers or smaller businesses can be subsidized to help offset the costs.

PART V. THE ENERGY POLICY ACT SHOULD BE AMENDED TO RESTRICT FEDERAL FACILITIES FROM BEING EXEMPT FROM ENERGY MANAGEMENT REQUIREMENTS

The Energy Policy Act ("EPAct") offers an alternative solution for reducing the indirect greenhouse gas emissions by data centers of federal facilities. If, however, the EPAct is to provide an effective solution for reducing the indirect sources of greenhouse gas emissions of even federal facilities, it must first be amended to either remove or alter the exception that allows federal facilities that are energy intensive or perform national security functions to be completely exempt from energy management requirements.

A. FEDERAL FACILITIES WERE INTENDED TO BE IN THE FOREFRONT IN IMPLEMENTING ENERGY CONSERVATION MEASURES

In 1978, Congress passed the National Energy Act ("NEA"), which composed of five bills: the National Energy Conservation Policy Act of 1978, the Powerplant and Industrial Fuel Use Act of 1978, the Public Utilities Regulatory Policy Act, the Natural Gas Policy Act of 1978, and the Energy Tax Act of 1978.[104] The NEA established energy conservation programs, energy efficiency programs, alternative fuel programs, tax incentives and disincentives, and market-based and regulatory initiatives.[105] Under the National Energy Conservation Policy Act, Congress mandated energy audits

[104] National Energy Conservation Policy Act of 1978, 42 U.S.C. §§ 8201–8287d (2012).

[105] *Id*.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

in all existing federal buildings.[106] Congress, in its findings, determined that "the [f]ederal Government, the largest energy consumer in the United States, should be in the forefront in implementing energy conservation measures and in promoting the use of solar heating and cooling and other renewable energy sources."[107] Thus, Congress declared it the "the policy of the United States that the [f]ederal Government has the opportunity and responsibility, with the participation of industry, to further develop, demonstrate, and promote the use of energy conservation, solar heating and cooling, and other renewable energy sources in [f]ederal buildings."[108]

B. THE ENERGY POLICY ACT AND ENERGY SAVINGS PERFORMANCE CONTRACTS

The EPAct of 1992, later amended in 2005, amended the National Energy Conservation Policy Act[109] and "established various programs designed to foster the efficient use of energy and increased conservation."[110] Title I of the EPAct authorizes financial alternatives, such as tax incentives, loan guarantees and energy savings performance contracts ("ESPC"), to enable federal agencies to improve energy efficiency and conservation in federal facilities through the development and implementation of innovative technologies.[111] Title I of EPAct also mandates federal facilities to implement "energy efficiency measures that are technologically feasible and economically justified."[112] Section 911 of the EPAct provides that energy

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[106] National Energy Conservation Policy Act; Pub. L. No. 95-619, § 547, 92 Stat. 3206 (1978).

[107] *Id*. § 541(5).

[108] *Id*. § 542.

[109] Energy Policy Act of 1992, Pub. L. No. 102-486, § 152, 42 U.S.C.A § 8252 (1992).

[110] 1-59 Energy Law and Transactions § 59.01.

[111] Energy Policy Act of 1992, *supra* note 109.

[112] *Id*. § 6834(a)(1).

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

efficient programs should focus on "[r]educing the environmental impact of energy-related activities[,]" reducing the demand for energy of the United States, "[i]mproving the energy security of the United States[,]" "[i]ncreasing energy efficiency of vehicles, buildings, and industrial processes[,]" and "[r]educing the cost of energy and making the economy more efficient and competitive."[113]

ESPCs are one example of a financial alternative established by the EPAct that facilitates investments in cost effective innovative technologies for existing federal buildings concerned with energy conservation.[114] Such contracts place the "costs of implementing energy savings measures, including at least the costs (if any) incurred in making energy audits, acquiring and installing equipment, and training personnel" onto the contractor, an energy service company ("ESCO"), "in exchange for a share of any energy savings directly resulting from implementation of such measures during the term of the contract."[115] An ESPC is an agreement between an ESCO and a federal facility.[116] ESPCs "allow [f]ederal agencies to complete energy-savings projects without up-front capital costs and special

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[113] *Id*. § 16191.

[114] Federal Energy Management and Planning Programs, 10 C.F.R. § 436 (2013).

[115] 42 U.S.C. § 8287 (2012); *see also* U.S. DEP'T OF ENERGY FUNDING FEDERAL ENERGY WATER PROJECTS (2013), *available at* http:// www1.eere.energy.gov/femp/pdfs/project_funding_guide.pdf (other funding mechanisms include on-site renewable power purchase agreements (PPAs), utility energy service contracts (UESCs), and several state and Federal energy incentives programs).

[116] *Energy Savings Performance Contracts*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/oaintrnt/energy/espc.htm (last updated Nov. 5, 2012) [hereinafter *ESPC-EPA*].

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

Congressional appropriations."[117] The ESCO performs energy audits for federal buildings and identifies ways in which those buildings can reduce energy consumption.[118]

Typically this is accomplished by the ESCO designing a plan that meets the needs of the agency to increase the energy efficiency at a specific facility. Next, the ESCO "purchases and installs the necessary equipment, such as new energy-efficient windows, automated controls, and updated heating, ventilation, and air conditioning equipment."[119] The ESCO guarantees that the project will pay for itself, because the improvements will produce energy saving costs that will pay for the expenses of the project over the duration of the contract (up to 25 years), and "all additional cost savings [will] accrue to the agency" once the contract ends.[120]

Essentially the federal agency agrees to pay the ESCO "a share of the savings resulting from the energy efficiency improvements" in exchange for the federal agency "not having to pay for the equipment."[121] Finally, "the ESCO is responsible for maintaining the equipment, as well as measuring the energy consumption and savings"[122] and "the [ESCO's] compensation is directly linked to the cost savings from energy actually saved."[123] One example of a successful sustainable building project that reduced the environmental impact of a federal facility and created a high performance

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[117] *Energy Savings Performance Contracts*, ENERGY.GOV, http://energy.gov/eere/femp/articles/energy-savings-performance-contracts-0 (last visited Apr. 7, 2014) [hereinafter *ESPC-DOE*].

[118] *ESPC-EPA*, *supra* note 116.

[119] *Id*.

[120] *Id*.

[121] *Id*.

[122] *Id*.

[123] *Energy Service Companies*, ENERGY.GOV (Oct. 7, 2013, 1:43 PM), http://energy.gov/eere/femp/articles/energy-service-companies.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

building that saves energy is the U.S. EPA National Computer Center.[124] Most of the roof consists of solar panels "[t]o offset some of the environmental impact of the building's massive quantity of data-processing equipment[.]"[125] The other portion of the roof consists of a "reflective, white, Energy Star-compliant membrane" that "assists in mitigating unwanted radiant heat gain."[126]

The NSA has already taken a step in this direction by recently inking a deal with the Fort Meade, Maryland to use treated wastewater that would otherwise be dumped into a local river in Maryland to cool the servers at the newly constructed data center.[127] The NSA's Maryland data center, set to open in 2016, will use 5 million gallons per day of treated wastewater from a Maryland utility "that would otherwise be dumped into the nearby Little Patuxent River."[128]

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[124] *High Performance Buildings: U.S. EPA National Computer Center*, U.S. DEP'T OF ENERGY, http://femp.buildinggreen.com/overview.cfm?projectid=344 (last updated June 28, 2005).

[125] *Id*.

[126] *Id*.

[127] Tony Kontzer, *NSA Plans To Cool New Datacenter With Wastewater*, NETWORK COMPUTING (Jan. 10, 2014, 11:57 AM), http://www.networkcomputing.com/next-generation-data-center/servers/nsa-plans-to-cool-new-datacenter-with-wa/240165306?_mc=MP_IW_EDT_STUB; *see* William Opalka, *NSA Using Wastewater to Cool Data Center*, ENERGY MANAGER TODAY (Jan. 14, 2014), http://www.energymanagertoday.com/nsa-using-wastewater-to-cool-data-center-098045/?utm_source=el&utm_campaign=homefeed&utm_medium=link.

[128] Kontzer, *supra* note 127.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

C. AN AMENDMENT IS NEEDED TO ADDRESS THE CARBON FOOTPRINT OF SECRET SERVERS

ESPCs and ESCOs make various energy efficiency measures technologically feasible and economically justified.[129] Yet, despite these financial incentives that make energy conservation measures practical, the EPAct allows facilities that have some of the biggest impacts on greenhouse gases given their sizes and the normal practices of data centers to be excluded from energy management requirements. Agencies can exclude any federal facility or collection of facilities "if the head of an agency finds that . . . compliance with [energy efficiency] requirements would be impracticable[.]"[130] Impracticability is based on "the energy intensiveness of activities carried out in the [f]ederal building or collection of [f]ederal buildings" or if such facilities are "used in the performance of a national security function."[131] Energy intensiveness refers to "an industry that uses significant quantities of energy as part of its primary economic activities[.]"[132] Amongst the list of energy-intensive industries is "information technology, including data centers containing electrical equipment used in processing, storing, and transmitting digital information[.]"[133]

NSA would fall into this definition if not for the energy intensiveness of its computing capacity then for its national security function— making these otherwise practical, alternatively funded programs and energy conservation requirements impractical. Such an exemption, however, should not apply or at the very least be restricted. The energy intensiveness that results from the computing capacity required for facilities such as the NSA's centers in Utah

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[129] See *supra* Part V.B.

[130] Energy Management Requirements, 42 U.S.C. § 8253(c)(1)(A)(i) (2012).

[131] *Id*. § 8253(c)(1)(B).

[132] Energy-Intensive Industries Program, 42 U.S.C. § 17111(a)(2) (2012).

[133] *Id*. § 17111(a)(2)(A).

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

and Maryland is certainly important and energy management requirements should take this into account. Energy intensiveness alone, however, should not transform energy conservation measures that are otherwise practical into being impractical simply because of the amount of energy used in a building. Nor should the function of a facility, in itself, make such measures and requirements impractical.

Additionally, the exemption contradicts the intended purpose of the EPAct. In enacting the EPAct, Congress intended for federal facilities to lead the way in energy conservation and charged the federal government with the responsibility of promoting renewable energy sources and implementing energy conservation measures. In fact, "[t]he National Energy Conservation Policy Act . . . serves as the underlying authority for Federal energy management goals and requirements."[134]

President Obama, on October 5, 2009, signed an executive order ("EO") 13514 that "set sustainability goals for [f]ederal agencies and focuses on making improvements in their environmental, energy and economic performance."[135] EO 13514 lists "reducing energy intensity in agency buildings" as one of the goals for federal agencies.[136] The order directed the federal government to reduce its direct greenhouse gas emission by 28% by 2020 and indirect greenhouse gas emissions by 13%.[137] Agencies are required to "consider reductions associated with pursuing . . . opportunities with vendors and contractors to address and incorporate incentives to reduce

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[134] *National Energy Conservation Policy Act*, ENERGY.GOV, http://energy.gov/eere/femp/articles/national-energy-conservation-policy-act (last visited Apr. 7, 2014).

[135] *Federal Leadership in Environmental, Energy and Economic Performance—Executive Order 13514*, U.S. WHITE HOUSE, http://www.whitehouse.gov/administration/eop/ceq/sustainability (last visited Apr. 7, 2014) [hereinafter *Executive Order 13514*]; *see also* Exec. Order No. 13514, 74 Fed. Reg. 52117 (Oct. 5, 2009).

[136] Section 2(a)(i).

[137] *Executive Order 13514*, *supra* note 135.

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

greenhouse gas emissions (such as changes to manufacturing, utility or delivery services, modes of transportation used, or other changes in supply chain activities)."[138]

Data centers are specifically mention with agencies being directed to "promote electronics stewardship, in particular by . . . implementing best management practices for energy efficient management of servers and [f]ederal data centers[.]"[139] High performance sustainable federal building designs are even mention as agencies are directed to "pursu[e] cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials[.]"[140] Accordingly, the federal energy management requirement exemption should either be removed or be amended so that it is consistent with EO 13514. Otherwise a blanket exemption that allows for massive data centers to be exempt from energy management requirements solely due to energy intensiveness or involvement in national securities functions would exempt the most significant contributors to greenhouse gases and run counter to Congress' purpose established in the EPAct.

One way the statute could be amended so that it is consistent with EO 13514 would be for it to require that all federal facilities comply with energy management requirements. A federal facility should be required to apply for an exemption upon certifying that it cannot meet the applicable energy management requirements. In such circumstances, the President upon a determination that it is necessary in the interest of national security could grant an exemption. All exemptions, however, should include a 5-year compliance plan with intermediate plans aimed at meeting energy management standards.

Alternatively, the exemption could be removed entirely so that all federal facilities are required to comply with energy management

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[138] *Id.* § 2(b)(i).

[139] *Id*. § 2(h)(i)(v).

[140] *Id*. § 2(g)(iv).

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
http://pjephl.law.pitt.edu

requirements. Energy efficiency no longer poses a threat to national security given today's technology, financial incentives, and energy markets available. In fact, energy efficiency may even improve national security by enhancing energy independence and saving money for defense by using more energy efficient equipment and buildings and then using it to directly invest in defense programs. Energy efficiency would also improve national security by reducing the causalities of troops that result from refueling convoys in Iraq and Afghanistan.[141]

Finally, to the extent the EPAct provides a solution it is clear that the EPAct alone would be insufficient because it would not cover major non-federal facilities like Facebook and Microsoft. If it is to cover the energy consumption of non-federal facilities it must be amended to apply to all major facilities. Similar to how the EPA's proposal to set greenhouse gas emission limits for major stationary sources will only include the nations largest direct emitters of greenhouse gases, one approach to expanding the scope of the EPAct to include major non-federal facilities would be to define the size of the facilities covered by the EPAct so that only large commercial facilities are covered.

CONCLUSION

As cloud computing becomes more prominent and greenhouse gases emissions continue to rise, a federal regulation may be required to set emission limits on data centers given their significant contribution to global greenhouse gases. Under the CAA, the EPA's proposal of a rule to set greenhouse gas emission limits for major stationary sources and large commercial facilities would have offered a possible solution to regulating the greenhouse gases of data centers. The EPA, however, can still incorporate energy consumption into the design of a program to reduce the carbon pollution from existing power plants offers a great opportunity to regulate both direct and indirect greenhouse gas emissions of data centers.

[141] *Top 5 Reasons To Be Energy Efficient*, ALLIANCE TO SAVE ENERGY, http://www.ase.org/resources/top-5-reasons-be-energy-efficient#4 (July 20, 2012).

ISSN 2164-7976 (online) ● DOI 10.5195/pjephl.2014.77
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Additionally, the EPAct offers a solution for reducing indirect sources of greenhouse gases resulting from energy consumption in federal facilities by data centers. The EPAct, however, should be amended to restrict the exception that allows for federal facilities like the NSA's Utah and Maryland data centers—two of the largest data centers in the U.S.—to be completely exempt from energy management requirements given the financial incentives that make energy conservation measures practical.

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