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An Energy-Efficient Internet: The Next Revolution

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AN ENERGY-EFFICIENT INTERNET: THE NEXT REVOLUTION

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AN ENERGY-EFFICIENT INTERNET: THE NEXT REVOLUTION

ALVAN BALENT*

ABSTRACT

The Internet is now a staple of modern society, and as a result, there is great interest in finding ways to further develop the Internet and expand its services. Recent literature has begun to focus on one particular aspect of the Internet that needs improvement: its energy usage. Accordingly, this Note examines the potential benefits of an energy-efficient Internet and explains how taxation based on energy usage can provide a constant impetus to improve not only the Internet's energy efficiency but also that of other industries. Thus far, commentators have not published many works with regard to an Internet energy tax despite the longstanding debate over Internet taxation itself, which has largely centered upon the concept of a sales tax. This Note offers new insights into the Internet tax policy debate and provides a rudimentary framework for structuring an Internet energy tax.

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I. INTRODUCTION

Over the course of the last two decades, the Internet has revolutionized American society and humankind as a whole.[1] With the advent of email and instant messenger, the Internet changed the way we communicate; with the advent of search engines like Google and Yahoo, it changed the way we gather information; and now, with the advent of sites like Facebook and MySpace, the Internet is changing basic modes of social interactions.[2] The Internet has spurred economic growth by enabling the e-commerce phenomenon to develop.[3] It has also created many high-tech jobs that help build, maintain, and improve the Internet's vast technological infrastructure such as data centers, which are the buildings that hold the computer equipment supporting the information and communication systems.[4] This

* Alvan Balent, a graduate of Vassar College, is a May 2010 J.D. graduate from FSU College of Law. He would like to thank his friends and family for their much-appreciated assistance with this paper, particularly FSU Law Review editors Nathan Hill, Nancy Pinzino, and Amanda Swindle, and FSU Professor and Research Center Director, Faye Jones.

1. *See, e.g.*, MANUEL CASTELLS, THE RISE OF THE NETWORK SOCIETY: ECONOMY, SOCIETY AND CULTURE 387-88 (2000); CATHERINE L. MANN ET AL., GLOBAL ELECTRONIC COMMERCE: A POLICY PRIMER 16-18 (2000).

2. *See* CASTELLS, *supra* note 1; *see also* PRESTON GRALLA ET AL., HOW THE INTERNET WORKS 133 (1998).

3. Keith Regan, *UN: E-Commerce Key to Global Economic Growth*, E-COMMERCE TIMES, Nov. 21, 2001, *available at* http://www.ecommercetimes.com/story/14915.html; Mark W. Vigoroso, *The Golden Age of E-Commerce Profits,* E-COMMERCE TIMES, Mar. 19, 2002, http://www.ecommercetimes.com/story/16805.html?wlc=1226258239.

4. Jennifer D. Mitchell-Jackson, Energy Needs in an Internet Economy: A Closer

infrastructure requires a constant supply of energy—one that is more reliable than the United States energy grid typically supplies—in order to operate.[5] Between the Internet's constant expansion and the reluctance of data centers to share information for security reasons, it is difficult to determine exactly how much energy the Internet requires.[6] Studies, though, have estimated the Internet's net energy consumption, which includes all office equipment, to be anywhere between 1-13% of the United States' total electrical usage, and demand is increasing constantly.[7] From 2000 to 2005, "energy use associated with servers *doubled* . . . representing an aggregate annual growth rate of 14% per year for the U.S. . . . ."[8] An energy-efficient Internet has desirable benefits—namely, the enabling of greater Internet deployment especially into the poorest regions of the world and improved Internet reliability in an emergency situation such as a natural disaster. This Note explores how the U.S. tax code could be used to achieve an energy-efficient Internet.

II. OVERVIEW OF THE INTERNET TAXATION DEBATE

Taxing the Internet is a subject of contentious debate. This debate most often focuses on whether a sales tax should be levied upon all cyberpurchases, i.e., the online "retail sales of products and services, advertising, and business-to-business commerce."[9] Since its inception in the 1990s, e-commerce has been a profitable sector of the U.S. economy. For instance, government estimates showed that U.S. retail e-commerce sales were $5.3 billion in the fourth quarter of 1999 alone.[10] While this number was a tiny fraction of the $821.2 billion in total retail sales for that quarter, it was clear that the e-commerce

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Look at Data Centers (July 10, 2001) (unpublished M.S. thesis, University of California, Berkeley), *available at* http://enduse.lbl.gov/Info/datacenterreport.pdf, at 3.

5. *Id*.

6. *See generally* Peter W. Huber, *Dig More Coal—the PCs are Coming,* FORBES MAGAZINE, May 31, 1999, *available at* http://www.forbes.com/forbes/1999/0531/6311070a_2.html.

7. JONATHAN G. KOOMEY, ESTIMATING TOTAL POWER CONSUMPTION BY SERVERS IN THE U.S. AND THE WORLD 6 (2007), *available at* http://dl.klima2008.net/ccsl/koomey_long.pdf; *see also* Huber, *supra* note 6; Mitchell-Jackson, *supra* note 4, at 12. It may soon be possible to more accurately determine the energy usage of data centers because the Environmental Protection Agency has recently announced that it will soon provide Energy Star ratings for data centers. *EPA to Begin Energy Star Ratings for Data Centers*, ENVIRONMENTAL LEADER, Apr. 21, 2009, http://www.environmentalleader.com/2009/04/21/epa-to-release-energy-star-rating-for-data-centers/.

8. KOOMEY, *supra* note 7, at 6 (emphasis added).

9. Isabel M. Isidro, PowerHomeBiz.com, Internet Taxation: Which Side Are You On?, http://www.powerhomebiz.com/vol4/internet-taxation.htm (last visited Aug. 27, 2010).

10. Press Release, William M. Daley, Secretary of Commerce, Retail E-Commerce Sales for the Fourth Quarter 1999 Reach $5.3 Billion, Census Bureau Reports (Mar. 2, 2000), *available at* http://www2.census.gov/retail/releases/historical/ecomm/99Q4.pdf).

sector of the economy would continue to grow.[11] The number of people shopping online increased between 1998 and 1999 and consumer e-commerce gained acceptance globally.[12] Statistics have proven early studies to be accurate. Between 2000-2009, the world's Internet usage grew at a rate of 362.3%, and e-commerce is expected to become more than a $300 billion sector of the global economy between 2008-2012.[13] This figure will likely continue to increase because, as of September 2009, Internet service is only available to approximately 25.6% of the world's population.[14] As worldwide Internet use grows, e-commerce will expand with it.

In light of the explosive growth of e-commerce, the revenues from a potential Internet sales tax became impossible to ignore, and soon there was much literature on the subject. Proponents of such a tax argue that tax-free e-commerce is like tax evasion in which states lose billions in annual sales tax revenue.[15] This massive revenue loss "impair[s] the ability of state and local governments to improve education, roads, public safety, health, low-income housing, and many other essential services[,]" and may ultimately lead to an increase in other taxes to recoup the lost revenue.[16] Proponents of an Internet sales tax also contend that it is fundamentally unfair not to tax e-commerce when other services that are important to economic growth are taxed and when studies indicate that the vast majority of online shoppers would not be deterred from shopping online by a sales tax.[17]

Opponents of Internet taxation, however, argue that the Internet is in the early and critical stages of development. Thus, any tax on e-

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11. *Id.*; Soyeon Shim et al., *An Online Prepurchase Intentions Model: The Role of Intention to Search*, 77 J. RETAILING 397, 397 (2001), *available at* http://itu.dk/~petermeldgaard/B12/lektion%203/An%20online%20prepurchase%20intentions%20model%20_The%20role%20of%20intention%20to%20search.pdf.

12. Isidro, *supra* note 9; *U.S. Consumers Remain Bullish on Online Shopping This Holiday Season, According to Ernst & Young Study; Holiday Online Volume Projected to Exceed $10 Billion*, BUSINESS WIRE, Nov. 28, 2000, http://findarticles.com/p/articles/mi_m0EIN/is_2000_Nov_28/ai_67371621.

13. InternetWorldStats.com, Internet Usage Statistics, http://www.internetworldstats.com/stats.htm (last visited Aug. 27, 2010); Sucharita Mulpuru et al., *US eCommerce Forecast: 2008 To 2012*, FORRESTER, Jan. 18, 2008, http://www.forrester.com/rb/Research/us_ecommerce_forecast_2008_to_2012/q/id/41592/t/2; Sucharita Mulpuru, *Data Charts: US eCommerce: 2008 To 2012*, FORRESTER, May 6, 2008, http://www.forrester.com/rb/Research/us_ecommerce_forecast_2008_to_2012/q/id/41592/t/2; Barbara M. Fraumeni, *E-Commerce: Measurement and Measurement Issues*, 91 AM. ECON. REV. 318, 319 (2001).

14. AllAboutMarketResearch.com, Internet Growth and Stats: Today's Road to eCommerce and Global Trade, http://www.allaboutmarketresearch.com/internet.htm (last visited Aug. 27, 2010).

15. Neil Munro, *If It Grows, Tax It*, 40 COMM. OF THE ACM 11, 12 (1997), *available at* http://delivery.acm.org/10.1145/250000/242859/p11-munro.pdf?key1=242859&key2=4953504221&coll=GUIDE&dl=GUIDE&CFID=6516967&CFTOKEN=20177739.

16. Isidro, *supra* note 9.

17. Megan E. Groves, *Tolling the Information Superhighway: State Sales and Use Taxation of Electronic Commerce*, 13 HARV. J.L. & TECH. 619, 620 (2000).

commerce would slow the internet's growth before the tax gains acceptance among consumers. As evidence, opponents cite studies showing that e-commerce would decline if it were taxed.[18] They argue that e-commerce has increased regular retail purchases by citing a study showing that consumers only used the Internet to learn of an item before purchasing it in a store.[19] Tax opponents also argue that in addition to the Internet being a developing "medium whose full ramifications are not close to being understood[,]" the Internet's very nature prevents it from being controlled or regulated.[20] Because it is "inherently non-geographic," any tax on the Internet could lead to a reduction in the number of available jobs in the taxing nation as companies would relocate to places that do not tax them.[21] As illustrated by the passage and subsequent legislative extensions of the Internet Tax Nondiscrimination Act (ITNA), which restricts the taxing authority of state and local government over the Internet, the anti-Internet tax camp is currently winning this debate.[22] Although the ITNA complicated efforts to tax the Internet, this Act would not prohibit a federal effort to tax the Internet based upon its net energy consumption.[23] A federal tax scheme focused on energy rather than e-commerce transactions would thus be outside the scope of the ITNA.

III. WHY AN ENERGY TAX

Regardless of the ITNA's restrictions, the debate over Internet taxation has largely been focused around imposing sales and use taxes on Internet transactions. It is extremely difficult to locate publications that discuss the idea of an Internet energy tax.[24] Given the variety of

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18. Austan Goolsbee, *Internet Commerce, Tax Sensitivity, and the Generation Gap,* 14 TAX POL'Y & ECON. 45, 45 (2000).

19. Isidro, *supra* note 9; Shim, *supra* note 11, at 398.

20. David L. Forst, *Old and New Issues in the Taxation of Electronic Commerce*, 14 BERKELEY TECH. L.J. 711, 711 (1999); *see also* Isidro, *supra* note 9.

21. Isidro, *supra* note 9.

22. The ITNA, originally known as the Internet Tax Freedom Act, and its impact on Internet taxation is beyond the scope of this Note. However, for more information on ITNA, see Austan Goolsbee & Jonathan Zittrain, *Evaluating the Costs and Benefits of Taxing Internet Commerce,* 52 NAT'L TAX J. 413 (1999); Burke T. Ward & Janice C. Sipior, *To Tax or Not to Tax E-Commerce: A United Sates Perspective*, 5 J. ELECTRONIC COMM. RES. 172 (2004); K.C. Jones, *President Bush Signs Internet Tax Freedom Act*, INFORMATION WEEK, Nov. 7, 2007, http://www.informationweek.com/shared/printableArticle.jhtml?articleID=202801131; Xuan-Thao N. Nguyen, *The Internet, E-Commerce and Tax Considerations*, *in* ALI-ABA COURSE OF STUDY MATERIALS: INTERNET LAW FOR THE PRACTICAL LAWYER, SK102 (2005).

23. *See supra* note 22, and accompanying text.

24. In April 2000, the Advisory Commission on Electronic Commerce submitted its report to Congress on various ways to tax the Internet. While sales and use taxes were mentioned in this report, an energy tax was not. *See* ADVISORY COMMISSION OF ELECTRONIC COMMERCE, REPORT TO CONGRESS (2000), *available at* http://govinfo.library.unt.edu/ecommerce/report.htm. Energy taxes, however, do exist in

taxes in existence, this lack of diversity among the pro-Internet tax literature is surprising, especially when one of the primary arguments for an Internet sales tax is to recoup lost revenue.[25] The sales tax is not the only tax through which state and local governments raise revenue. Governments levy taxes on property and income. Governments also levy various excise taxes—taxes paid for the purchase of a specific good—such as those imposed on gas and tobacco sales.[26]

Of all these other taxes, an energy tax is one form of taxation that can definitively be imposed on the Internet. Studies examining Internet energy consumption illustrate that the Internet requires a sustained and reliable source of energy to operate.[27] Thus, while the Internet is "inherently non-geographic" in nature, its need for an energy source is the one grounding point through which it is vulnerable to national tax schemes.[28] Internet companies would have to submit to the tax in each country in which they wish to operate. In the case of the United States, which has an estimated 72.5% of its 300 million population connected to the Internet, an Internet company would sacrifice approximately 14.6% of the global Internet market if it avoided this tax; the rest of the world, with the exception of China, is still catching up to the United States in terms of Internet usage.[29] It seems unlikely that a business would sacrifice the opportunity to operate in the large, profitable U.S. market; therefore, these companies would have to accept this tax as part of the cost of doing business.

Internet tax opponents will nonetheless argue that this proposal will curtail Internet development when the Internet is still in the early stages of development. This argument, however, has been significantly undermined by the passage of time; consequently, it is difficult to say that the Internet is in the same early stage of development as it was in the 1990s, nearly twenty years ago. The fact that many technology companies survived the "dot-com" crash demonstrates that the Inter-

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other forums. *See, e.g.,* FLA. STAT. § 203.01 (2006) (addressing taxes on gross receipts for utility and communications services).

25. *See* Isidro, *supra* note 9.

26. IRS.gov, Excise Tax, http://www.irs.gov/businesses/small/article/0,,id=99517,00.html (last visited Aug. 27, 2010).

27. *See* KOOMEY, *supra* note 7, at 1.

28. Isidro, *supra* note 9.

29. InternetWorldStats.com, United States of America: Internet Usage and Broadband Usage Report, http://www.internetworldstats.com/am/us.htm (last visited Aug. 27, 2010); INTERNATIONAL TELECOMMUNICATION UNION, WORLD TELECOMMUNICATION DEVELOPMENT REPORT: ACCESS INDICATORS FOR THE INFORMATION SOCIETY 22 Table 5.2 (2003) (comparing the degrees of Internet access in different countries); InternetWorldStats.com, Internet Usage and Population in North America, http://www.internetworldstats.com/stats14.htm#north (last visited Aug. 27, 2010); Yuli Yang, *China Tops World in Internet Users*, CNN, Jan. 14, 2009, http://www.cnn.com/2009/TECH/01/14/china.internet/index.html.

net is firmly established in the very threadwork of society.[30] Moreover, studies of the dot-com era, 1995-2001, found that Internet company attrition rates were roughly 20% a year, which is no different from other industries in their formative years.[31] Thus, the histories of how other industries grappled with the imposition of tax burdens should have substantive value to those designing an Internet energy tax by illuminating how best to integrate the tax burden into the new industry. Moreover, the fact that other industries, such as pharmaceuticals, have been able to profitably grow despite being taxed at reasonable levels strongly suggests that the Internet will not crumble once it assumes its share of societal tax burdens.[32]

Further weakening the argument that Internet growth would suffer if taxed is the fact that the Internet not only survived the dot-com crash, but it emerged stronger than before. As mentioned above, the number of global Internet users skyrocketed from 360 million people in 2000 to nearly 1.5 billion in 2008, and e-commerce also became a multi-billion dollar industry in the same time span.[33] This rapid increase and the fact that all indicators point to more growth make it highly doubtful that Internet usage will decrease. Spikes in gas prices also make the likelihood of decreased Internet usage more remote because businesses and consumers will likely turn to e-commerce shopping and delivery services in order to save money by reducing their gas costs.[34] In fact, the Internet is now so strong that it is an emerging threat to the livelihood of well-established business like newspapers, which are struggling to cope with massive losses in ad revenues as advertisers invest more heavily in online ads.[35] Online viewership has also aggravated the financial strain of newspapers by depressing sales of printed papers.[36]

Perhaps most emblematic of the Internet's strong footing in society is its newfound centrality in American political campaigns.[37] For example, in 2004, the Internet helped propel Howard Dean from a

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30. *See* Lee Gomes, *The Dot-Com Bubble Is Reconsidered–And Maybe Relived*, WALL ST. J., Nov. 8, 2006, at B1.

31. *Id*; Brent Goldfarb et al., *Was There Too Little Entry During the Dot Com Era?,* 86 J. FIN. ECON. 100, 124 (2007).

32. *See*, *e.g.*, GARY GUENTHER, FEDERAL TAXATION OF THE DRUG INDUSTRY AND ITS EFFECTS ON NEW DRUG DEVELOPMENT 23-25 (2009), *available at* http://www.policyarchive.org/handle/10207/bitstreams/18823.pdf.

33. InternetWorldStats.com, *supra* note 13.

34. *See generally* Cool-Companies.org, Energy & the Internet: Internet, New Economy Technology Yield Dramatic Energy and Environmental Savings, http://www.cool-companies.org/energy/debunk.cfm (last visited Aug. 27, 2010).

35. Richard Perez-Pena, *Papers Facing Worst Year for Ad Revenue*, N.Y. TIMES, June 23, 2008, at C3; *see also* Kathy Shwiff, *McClatchy to Cut Additional Jobs and Dividend*, WALL ST. J., Sept. 17, 2008, at B7.

36. Penez-Pena, *supra* note 35.

37. *See* Aaron Smith, *The Internet's Role in Campaign 2008*, PEW INTERNET, Apr. 15 2009, http://www.pewinternet.org/Reports/2009/6--The-Internets-Role-in-Campaign-2008.aspx.

dark horse candidate in the Democratic presidential primaries to front-runner status.[38] In 2006, the Internet helped give the Democrats control of the U.S. Senate by capturing and broadcasting the infamous "macaca moment" of former Senator George Allen of Virginia, a Republican who was previously considered "a sure bet for reelection" and a possible 2008 presidential contender.[39] That broadcast contributed to his defeat.[40] These events, though, were mere harbingers of the Internet's political relevance in Barack Obama's presidential campaign. One only needs to look at the 2008 U.S. presidential election cycle to see how central the Internet is in political campaigns.[41] The Internet enabled Mr. Obama to amass a political organization so strong that he was able to defeat Hillary Clinton and consistently raise record-setting amounts of campaign cash—upwards of $150 million in a month and about $600 million total.[42] It also allowed Mr. Obama to appeal to and engage younger voters at unprecedented levels, as they tend to be more Internet-savvy.[43] Mr. Obama, as a result, became the 44th President of the United States.[44]

Considering all of the above, it is clear that the Internet has a firm place in society. Thus, one can argue that it is time the Internet start shouldering its fair share of the societal tax burden.[45] It is highly unlikely that subjecting the Internet to some form of taxation would cripple it because it is so well accepted by younger generations.[46] Thus, Internet companies have a guaranteed client-base that will naturally expand through the on-going process of generational change in society. The Internet taxation argument, therefore, boils down to one question: if the Internet is not taxed now, then when? In answering this question, one must remember that as time passes, the strength of the interest groups vested in the status quo of a tax-free Internet only increases, which makes implementing any new policy more difficult.

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38. Jodi Wilgoren & Jim Rutenberg, *The 2004 Campaign: The Former Governor; Missteps Pulled A Surging Dean Back to Earth*, N.Y. TIMES, Feb. 1, 2004, at 11.

39. Kate Zernike, *Macaca*, N.Y. TIMES, Dec. 24, 2006, at 44.

40. *Id.*

41. Brian Stelter, *The Facebooker Who Friended Obama*, N.Y. TIMES, July 7, 2008, at C1.

42. *Id.*; Jeff Zeleny et al., *Donation Record as Colin Powell Endorses Obama*, N.Y. TIMES, Oct. 20, 2008, at A1.

43. *See* Stelter, *supra* note 41, at C1; Leslie Sanchez, *Commentary: GOP Needs to Catch up to Obama's Web Savvy*, CNN, Nov. 9, 2008, http://www.cnn.com/2008/POLITICS/11/07/sanchez.technology/index.html.

44. Sarah Lai Stirland, *Propelled by Internet, Barack Obama Wins Presidency*, WIRED, Nov. 4, 2008, http://www.wired.com/threatlevel/2008/11/propelled-by-in/.

45. Geoffrey A. Fowler & Erica Alini, *States Plot New Path to Tax Online Retailers*, WALL ST. J., July 3, 2009, at B1.

46. *See* Sucharita Mulpuru et al., *Why US B2C eCommerce Will Weather the Economic Downturn Well*, FORRESTER, Apr. 30, 2008, http://www.forrester.com/rb/Research/why_us_b2c_ecommerce_will_weather_economic/q/id/45932/t/2.

Taxing the Internet in a way that encourages energy efficiency will not curtail its future growth. In fact, the exact opposite will occur. Studies have shown that the Internet's power needs restrict the areas where it can be deployed. This in turn restricts its ability to expand because electricity is a scarce resource in many parts of the world.[47] By reducing the Internet's energy consumption, companies will be able to deploy more Internet devices and services, and the profits from these new deployments will likely offset the costs of an energy tax.[48]

VNL, a Swedish mobile phone company, used this approach to economically expand its business into the world's poorest and most remote areas.[49] Companies generally cannot afford to reach these areas, which in India alone amounts to writing off approximately 700 million potential customers.[50] In VNL's case, the company was confronted with the high costs of installing, running, and maintaining transmission towers and recovering these costs from people who could only afford to pay about $2 per month for phone service.[51] VNL, however, managed to profitably expand into these rural areas by remodeling their transmission towers and making them energy efficient.[52] These new towers are "roughly the size of a laser printer . . . [and] are powered by solar energy and use only as much energy as a 100-watt lightbulb."[53] These towers only cost $3500 to install, which is significantly lower than the $10,000 to $100,000 installation price range for standard transmission towers.[54] Overall, these rural base stations generate $15 billion in annual profits, and this number is expected to grow at a rate of 15% to 20% a year.[55]

In addition to increasing business revenues, it is common knowledge that Internet access benefits society by allowing for greater communication and distribution of information. The development of an energy-efficient Internet will expand Internet access, providing these benefits to presently underserved regions. Similarly, society will receive the environmental and national security benefits that are commonly associated with energy efficiency. An energy-efficient Internet, however, will uniquely benefit society in that it may help save lives in

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47. MARUTI GUPTA & SURESH SINGH, GREENING OF THE INTERNET 20 (2003), http://delivery.acm.org/10.1145/870000/863959/p19-gupta.pdf?key1=863959&key2=3731670221&coll=GUIDE&dl=GUIDE&CFID=1877967&CFTOKEN=84349380.

48. *See id.*

49. Jennifer L. Schenker, *Making Mobile Networks Cheap and Green*, BUS. WEEK ONLINE, Aug. 4, 2008, http://www.businessweek.com/globalbiz/content/aug2008/gb2008081_590263.htm.

50. *Id.*

51. *Id.*

52. *Id.*

53. *Id.*

54. *Id.*

55. *Id.*

the event of a disaster.[56] In disaster-hit areas, network equipment must largely rely on batteries in order to operate; therefore, by having communication devices that require less energy, these batteries will last longer.[57] Longer battery life will enable hospitals, police, rescue workers, and other agencies to have access to critical communication networks and resources they need for longer lengths of time.

The importance of having energy-efficient equipment in disaster areas was keenly illustrated during the aftermath of Hurricane Katrina. After Katrina, communication between different emergency response agencies was essentially non-existent because many cell towers, emergency communication equipment, and 911 centers were rendered inoperable.[58] Communication was sporadic, and as a result, Washington officials had trouble gathering information about the area, impairing their ability to assist local officials in the recovery effort.[59] These communication difficulties were surprising because since September 11, 2001, the government has spent millions of dollars upgrading emergency phone and radio communication systems, with states receiving $830 million in the 2004 fiscal year alone.[60] Although some state and local communities were slow to upgrade their communication systems, rescue efforts were not hampered because they were lacking modern or advanced technology, but because they lacked something far more basic—adequate power.[61] As a result, this high-tech, expensive radio and phone equipment became useless.

> "Field personnel are beginning to lose power on the radios because they don't have any way to recharge them." . . . Emergency generators powering some cell towers and underground phone switches, which route traditional phone calls, may also soon begin to go dark. "The issue is a power issue at its core."[62]

This lack of power not only hindered the government's rescue efforts, it also delayed the restoration of normal social services because the limited energy available was needed to keep emergency services operational.[63] The fact that energy inefficiency contributed to these post-Katrina power problems is particularly disturbing because energy efficiency can begin to be achieved through simple efforts. An energy-efficient communication system may have saved lives during Katrina

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56. GUPTA & SINGH, *supra* note 47, at 20.

57. *Id.*

58. Christopher Rhoads & Amy Schatz, *In Katrina's Wake: Power Outages Hamstring Most Emergency Communications*, WALL ST. J., Sept. 1, 2005, at A7.

59. *Id.*

60. *Id.*

61. *Id.*

62. *Id.* (quoting Courtney McCarron, spokeswoman for the Assoc. of Public-Safety Commc'ns Officials, and an unnamed FCC official).

63. *Id.*

and during other emergencies as well. It is, therefore, imperative that energy efficiency measures be taken to save lives in the future.

Moreover, energy efficiency is a very safe area for routine corporate investments because such investments have quick, guaranteed, and continuing returns in terms of corporate savings.[64] Companies do not need to do much more than take small actions to save energy. These actions include "changing the light bulbs . . . installing . . . double-pane windows, or simply buying a new lamp," and eventually, these "many small actions can add up to big savings[.]"[65] This point is best illustrated through Dow Chemical's Louisiana division, whose energy department in 1982 began a yearly contest to discovery energy-saving projects.[66] Many of the discovered projects were simple, such as more efficient compressors and better insulation, yet this contest also yielded surprising results.[67]

> The first year of the contest had 27 winners requiring a total capital investment of $1.7 million with an average annual return on investment of 173 percent. Many at Dow felt that there couldn't be others with such high returns. The skeptics were wrong. The 1983 contest had 32 winners requiring a total capital investment of $2.2 million and a 340 percent return—a savings of $7.5 million in the first year and every year after that. Even as fuel prices declined in the mid-1980s, the savings kept growing. The average return to the 1989 contest was the highest ever, an astounding 470 percent in 1989—a payback of 11 weeks that saved the company $37 million a year.[68]

Ten years and 700 projects later, "the 2,000 Dow employees" are not yet "tapped out of ideas."[69] The 1991-93 contests "each had in excess of 120 winners with an average return on investment of 300 percent. Total savings to Dow from just those projects exceeded $75 million a year."[70] An energy tax is therefore nothing more than a tool to insure that these small actions are taken. Thus, so long as it is reasonable, an energy tax should not hamper growth as the anti-Internet tax camp argued with respect to an Internet sales tax. An Internet energy tax should therefore be examined.

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64. Joseph Romm, *Why We Never Need to Build Another Polluting Power Plant*, SALON, July 28, 2008, http://www.salon.com/news/feature/2008/07/28/energy_efficiency/print.html; *see generally* BOOSTING RESTAURANT PROFITS WITH ENERGY EFFICIENCY: A GUIDE FOR RESTAURANT OWNERS AND MANAGERS (2006), *available at* http://www.fypower.org/pdf/BPG_RestaurantEnergyEfficiency.pdf.

65. Sarah Jane Tribble, *Small Changes Can Yield Energy Savings in California*, MERCURY NEWS, June 8, 2007, http://www.mercurynews.com/greenenergy/ ci_6086258.

66. Romm, *supra* note 64.

67. *Id.*

68. *Id.*

69. *Id.*

70. *Id.*

IV. WHY ACHIEVING ENERGY EFFICIENCY REQUIRES GOVERNMENT INTERVENTION

Given that energy efficiency is beneficial to corporate interests, opponents of government regulation will nevertheless claim that improvements in energy efficiency will occur without government involvement.[71] Such opponents will also say that market forces have yet to address energy efficiency because the issue itself is relatively novel and only recently became an issue of serious consideration. The EPA's voluntary "Energy Star" program, for example, has only existed since 1992.[72] Accordingly, these opponents will likely assert that the best role for the government is not to tax but to create educational programs on energy efficiency, which will then facilitate the development of market solutions.[73]

Educational programs would obviously be helpful, but they already exist. The United States Department of Energy (DOE), for instance, has a separate office—the Office of Energy Efficiency and Renewable Energy—that has many programs to assist in delivering energy savings.[74] Private organizations, such as environmental groups, also provide similar information. For example, Greenpeace releases a guide to greener electronic products every three months.[75] Because the Internet makes all this information easily accessible, additional education programs are unnecessary.

The failure of corporate executives to utilize these programs shows that educational programs can be ignored and demonstrates the need for government involvement beyond the educational level. Education alone does nothing to insure that companies will seriously invest in energy efficiency on the consistent basis that meaningful energy efficiency requires, especially because new technologies continuously en-

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71. *See* Romm, *supra* note 64; *see generally* WILLIAM J. BAUMOL, THE FREE-MARKET INNOVATION MACHINE: ANALYZING THE GROWTH MIRACLE OF CAPITALISM (2002) (arguing that free-market pressures inherent in capitalism are constantly forcing firms to innovate, without need of government intervention).

72. Marla C. Sanchez et al., *Savings Estimates for the United States Environmental Protection Agency's ENERGY STAR Voluntary Product Labeling Program*, 36 ENERGY POL'Y 2098, 2098 (2008).

73. *See generally* Julie A. Caswell & Eliza M. Mojduszka, *Using Informational Labeling to Influence the Market for Quality in Food Products* 78 AM. J. OF AGRIC. ECON. 1248, 1248 (1996) (arguing that "government policies and regulations" on labeling—i.e., facilitating the communication of information to consumers—greatly affects the development of markets for food quality).

74. United States Department of Energy, Energy Efficiency and Renewable Energy, http://www.eere.energy.gov/ (last visited Aug. 27, 2010).

75. Simon Avery, *New Tech Battleground: Who is the Greenest?*, GLOBE & MAIL, Sept. 9, 2008, at B6, *available at* http://www.theglobeandmail.com/news/technology/article708478.ece; Greenpeace, Guide to Greener Electronics, http://www.greenpeace.org/electronics (last visited Aug. 27, 2010).

able greater efficiency.[76] Further, as developments in the American and Japanese auto industries illustrates, leaving energy efficiency to market forces alone makes it difficult to determine which companies will pursue the matter. Thus, without government involvement, progress towards energy efficiency will likely occur in a piecemeal fashion with progress only occurring when the issue has the public's interest.[77] Piecemeal progress towards energy efficiency, however, is unacceptable given this issue's national security implications.[78]

The current state of the American auto industry exemplifies how market forces alone do not induce companies to save energy. As seen by its need for congressional bailouts and GM's and Chrysler's subsequent bankruptcy filings, the U.S. auto industry is in dire straits.[79] The industry, however, had been on the road to its current situation for many years as sales of SUVs and pick-up trucks declined because customers, due to rising oil prices, shifted to smaller, more fuel-efficient passenger cars.[80] Such cars were not staples of the Big Three—Ford, GM, and Chrysler. The 2008 credit crisis merely magnified the financial strain that the Big Three faced.

To be fair to the Big Three, SUV and pick-up truck sales were, until recently, a very profitable market.[81] Given that America's love-affair with such vehicles, which only began to wane in the past few years, it makes sense that these companies invested resources into these cars.[82] These cars accordingly became bigger and faster but not more fuel-efficient.[83] The Big Three's failure to improve every aspect of these vehicles is odd because increasing fuel efficiency was clearly possible. Honda's 2000 model vehicles, for example, had an average fuel efficiency that was six miles to the gallon higher than the aver-

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76. *See* Romm, *supra* note 64; *see also* Pam Frost Gorder, Materials May Help Autos Turn Heat into Electricity (July 25, 2008), http://www.renewableenergyworld.com/rea//news/article/ 2008/07/material-may-help-autos-turn-heat-into-electricity-53145.

77. *See generally* Baumol, *supra* note 71.

78. Daniel Yergin, *Ensuring Energy Security*, 85 FOREIGN AFF. 69, 69 (2006), *available at* http://www.un.org/ga/61/second/daniel_yergin_energysecurity.pdf.

79. Aparajita Saha-Bubna, *Corporate News: U.S. Auto Makers Seek Bailout for Bad Car Loans–Relief Plan, Part of Original Wall Street Rescue Package, Could Free Up Loans for Car Dealers as Well as Their Customers*, WALL ST. J., Oct. 1, 2008, at B3; Jim Rutenberg & Bill Vlasic, *Chrysler Files for Bankruptcy; U.A.W. and Fiat to Take Control*, N.Y. TIMES, May 1, 2009, at A1; Neil King Jr. & Sharon Terlep, *GM Collapses into Government's Arms: Second-Largest Industrial Bankruptcy in History*, WALL ST. J., June 2, 2009, at A1.

80. Bill Vlasic & Nick Bunkley, *The Struggles of Detroit Ensnare Its Workers*, N.Y. TIMES, July 3, 2008, at C1; Bill Vlasic, *As Gas Costs Soar, Buyers Are Flocking to Small Cars*, N.Y. TIMES, May 2, 2008, at A1.

81. Micheline Maynard, *With $3 Gas, Detroit Pays for its Past,* N.Y. TIMES, July 28, 2006, at C1, *available at* http://www.nytimes.com/2006/07/28/business/worldbusiness/28auto.html.

82. *See id.*; *see also* Bill Vlasic, *Interest Fades in the Once-Mighty V-8*, N.Y. TIMES, Jan. 16, 2008, at C1.

83. Micheline Maynard, *Downturn Will Test Obama's Vision for an Energy-Efficient Auto Industry*, N.Y. TIMES, Dec. 21, 2008, at A38.

age American automobile.[84] Moreover, there were signs that consumers wanted greater fuel-efficient vehicles by the increased demand for hybrid vehicles. In 2004 for example, the demand for hybrids was so strong that there was a two year waiting list for the new Toyota Prius; meanwhile, Ford and GM needed to prop up their SUV and pick-up truck sales through discount offers.[85] The Big Three were basically absent from the hybrid market until 2005 when Ford introduced the Escape Hybrid.[86] In contrast, the Toyota Prius debuted in Japan in 1997 and over 1 million vehicles had been sold in the United States by 2008, allowing Toyota to capitalize on this shift in consumer demand.[87] The Big Three's past decisions complicated their recent efforts to be more fuel-efficient because these companies have the reputation of producing "gas-guzzlers."[88] Consequently, they must overcome this reputation while playing "catch-up" with their competitors on the issue of fuel efficiency.[89]

While one can argue that the Big Three's management decisions were rational at the time they were made, these automakers not only ignored fuel efficiency but actively campaigned against congressional efforts to raise federal fuel efficiency standards.[90] Their opposition to such efforts stemmed from the fact that it is costly to implement changes in fuel efficiency.[91] Congress' 2007 increase in U.S. fuel standards was the first increase in these standards since 1984.[92] It, therefore, becomes easy to understand why the Big Three invested in other

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84. Danny Hakim, *Honda Takes up Case in U.S. for Green Energy*, N.Y. TIMES, June 12, 2002, at C1.

85. Jane Gross, *From Guilt Trip to Hot Wheels*, N.Y. TIMES, June 13, 2004, at 9; John D. Stoll & Joseph B. White, *Moody's Cuts GM, Ford Debt to Junk; Cost Concerns Gain Focus Ahead of UAW Negotiations; Downgrade Follows S&P's*, WALL ST. J., Aug. 25, 2005, at A3.

86. Jerry Garrett, *Around the Block: A Look at an Overlooked Hybrid*, N.Y. TIMES, July 30, 2006, at 12; Richard Truett, Big 3 Play Catch-up in the Hybrid Game, but Automakers Have Different Approaches (Apr. 11, 2005), http://www.autosafety.org/big-3-play-catch-hybrid-game.

87. Todd Kaho, Decade of the Toyota Prius Hybrid (Nov. 5, 2007), http://www.greencar.com/features/decade-of-the-toyota-prius; Chuck Squatriglia, *Prius Sales Top 1 Million. Want One? Better Move Fast*, WIRED, May 15, 2008, http://www.wired.com/autopia/2008/05/prius-sales-top.

88. Mike Spector & Maya Jackson-Randall, *Big Three Try to Rev Up Weakened Political Clout—Congress Is Asked to Ease its Plans on Fuel Standards*, WALL ST. J., June 7, 2007, at A4.

89. *Id.*; Bill Vlasic, *As Gas Costs Soar, Buyers Are Flocking to Small Cars*, N.Y. TIMES, May 2, 2008, at A1.

90. Maynard, *supra* note 81; Hakim, *supra* note 84 (2002 Senate proposal to raise fuel efficiency standards for the first time since the 1980s defeated). The documentary *Who Killed the Electric Car* even suggests that the Big Three conspired against more energy-efficient vehicles. Who Killed the Electric Car? (June 9, 2006), http://www.pbs.org/now/shows/223/.

91. Stephen Power & Christopher Conkey, *U.S. Orders Stricter Fuel Goals for Autos*, WALL ST. J., May 19, 2009, *available at* http://online.wsj.com/article/SB124266939482331283.html.

92. *Id.*; *see also* John M. Broder & Micheline Maynard, *Deal in Congress on Plan to Raise Fuel Efficiency*, N. Y. TIMES, Dec. 1, 2007, at A1.

aspects of their cars but ignored fuel efficiency over this twenty-three year stretch of time. Small but continual investment over these twenty-three years would have lessened the financial burden now associated with improving fuel efficiency. Such systematic investment would also have been financially manageable and have enabled the Big Three to better compete in today's market. For instance, the companies may have advanced the use of potential energy saving devices like thermoelectrics—materials that can possibly make cars more efficient by converting heat wasted through engine exhaust into electricity.[93] Instead, General Motors and Chrysler went bankrupt[94] and must comply with the new federal fuel standards. These new cars, however, will not be ready until some future date when it is possible that technological advancements will already have outdated the 2007 standards.

While the current state of the U.S. auto industry may be the result of market forces playing themselves out, it shows that market forces alone do not produce comprehensive progress in energy efficiency; they just award innovation. Additionally, the Big Three's former profitability illustrates that energy inefficiency can at times be financially rewarding. However, wasting energy is socially undesirable given the aforementioned environmental and national security implications. The attacks of September 11, 2001, and oil's rise to $147 a barrel in 2008 have only served to reiterate this correlation.[95] Energy efficiency is too important an issue to be left to market forces. Government must be involved in some form. Regulations like fuel standards are helpful because they provide a comprehensive minimum that must be met. However, given technology's ability to constantly open up new avenues for greater energy savings, government energy efficiency regulations would have to constantly be revised and updated.[96] The aforementioned lobbying efforts of the Big Three show how difficult it can be to update regulations. In contrast, a tax-based approach to energy efficiency would be able to inherently update itself because taxes can be established so that they are paid and reassessed annually.

In addition to insuring that there would be continuous investments in energy efficiency, a tax-based approach has a proven record

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93. Gorder, *supra* note 76.

94. Chris Woodyard, *Ford Faces Competition; Bankruptcy Gives Rivals Benefits*, USA TODAY, June 2, 2009, http://www.usatoday.com/money/autos/2009-06-01-bankruptcy-competition-ford_N.htm.

95. UNITED STATES ENERGY ASSOCIATION, NATIONAL ENERGY SECURITY POST 9/11 4-6 (2002), http://www.usea.org/publications/documents/useareport.pdf; *see also* Kathryn Hopkins, *Fuel Prices: Iran Missile Launches Send Oil to $147 a Barrel Record*, THE GUARDIAN, July 12, 2008, http://www.guardian.co.uk/business/2008/jul/12/oil.commodities.

96. *See* Romm, *supra* note 64; *see also* Broder & Maynard, *supra* note 92.

of effectively achieving energy efficiency.[97] For example, in 1973, Denmark imported 99% of its energy needs from the Middle East, and consequently, it was gravely affected by the 1973 oil embargo.[98] To cope with the ensuring energy crisis, the Danish government had to take stringent measures, such as "bann[ing] all Sunday driving for a while" to curb energy demand.[99] Denmark also seriously engaged the issue of energy independence in a "focused and systematic way."[100] As a result, Denmark now imports no oil from the Middle East and gets nearly 20% of its energy from wind.[101] Denmark achieved these results through a series of taxes, such as $10 gas taxes, and "green" building and appliance standards.[102] Contrary to popular belief, these taxes did not cripple the Danish economy. Instead, the economy grew while national energy consumption barely increased.[103] Denmark has also developed one of the world's most competitive clean-power industries, and energy-efficient technology has emerged as one of Denmark's fastest-growing export areas.[104] The resulting energy revenues have prompted Denmark to look into reforming its tax code to include more emphasis on energy taxes and less on personal income taxes.[105]

Market forces alone, by comparison, do not produce similar results. For instance, the United States has gone from importing 24% of its oil to 70%–roughly 12 million barrels a day–during the same thirty-five year time span and only gets about 1% of its energy from wind.[106] It is also absent from the clean-energy market.[107] Some companies, though, have begun making investments in this area. Google, for instance, recently patented a way to power its Internet data servers using tidal power.[108] Personal computer manufacturers have also begun "tackling the problem" of their products' enormous energy use.[109] However, as seen in Denmark, meaningful progress in energy

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97. Thomas L. Friedman, *Flush with Energy*, N.Y. TIMES, Aug. 10, 2008, at WK, *available at* http://www.nytimes.com/2008/08/10/opinion/10friedman1.html?_r=1.

98. *Id.*

99. *Id.*

100. *Id.*

101. *Id.*

102. *Id.*

103. *Id.*

104. *Id.*

105. *Id.*

106. *Id.*; Pickens Plan, Did You Know?, http://www.pickensplan.com/didyouknow (last visited Aug. 27, 2010).

107. Friedman, *supra* note 97 ("We've had 35 new competitors coming out of China in the last 18 months . . . and not one out of the U.S.").

108. Thomas Claburn, *Google Granted Floating Data Center Patent*, INFORMATION WEEK, Apr. 30, 2009, http://www.informationweek.com/news/internet/google/showArticle.jhtml?articleID=217201005.

109. Jim Carlton, *The PC Goes on an Energy Diet*, WALL ST. J., Sept. 8, 2009, at R8.

efficiency requires government involvement.[110] If left to market forces alone, Google may be the next Honda among a sea of Big Three-like companies that waste energy.[111] Although energy crises periodically occur, commentators have debated that the energy efficiency fervor may again subside with the passing of the 2008 energy crisis.[112] Given the centrality of energy resources to all parts of American society, there must be strong government measures to more comprehensively insure that energy resources are utilized efficiently.

Some may argue that Denmark's success with energy taxes cannot be equated to the United States because of the many differences between the two countries, most notably geographical size. California, though, has successfully implemented measures similar to those of Denmark, and the energy consumption differences between California and the rest of the United States further illustrate how energy efficiency is best achieved through government involvement.[113] California began legislating energy efficiency in the 1970s, and its energy consumption has subsequently remained constant, in spite of the tech-boom and its growing population; meanwhile, over those same forty years, the rest of the nation's per capita electricity consumption increased 60%.[114] If all Americans adopted California's energy standards, U.S. electrical consumption would decrease by 40%.[115] According to a 2007 report from the international consulting firm McKinsey and Co., such energy savings could "offset almost all of the projected demand for electricity in 2030 and largely negate the need for new . . . power plants."[116] The magnitude of these savings should also allow for the quick recovery of any implementation costs.[117] The fact that companies can quickly recover their energy investments through savings consequently undermines the argument that a tax-based approach to energy efficiency would unduly burden business.

Nevertheless, a tax proposal will likely be criticized as unnecessary government involvement in corporate affairs. Such criticisms, however, overlook the fact that while there may be some overlap, corporations exist to make money, not to further important social objectives.

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110. *See generally* Levine, *supra* note 77.

111. *See* Hakim, *supra* note 84.

112. *See* Vivienne Walt, *Is Cheaper Oil a Good Thing?*, TIME, Oct. 10, 2008, http://www.time.com/time/business/article/0,8599,1849215,00.html; Vivienne Walt, *What's Behind (and Ahead for) the Plunging Price of Oil*, TIME, Oct. 24, 2008, http://www.time.com/time/printout/0,8816,1853775,00.html.

113. Romm, *supra* note 64.

114. *Id.* (providing an overview on California's energy efficiency efforts); *see also* The California Energy Commission, http://www.energy.ca.gov/ (last visited Aug. 27, 2010).

115. Romm, *supra* note 64.

116. *Id.* (citing McKinsey and Co., Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?, http://www.mckinsey.com/clientservice/ccsi/greenhousegas.asp (last visited Aug. 27, 2010)).

117. *Id.*

This scenario was seen in 2006-2007 when U.S. beverage companies, in order to fend off mounting public pressure and potential lawsuits or government regulations, voluntarily agreed to stop selling sugared sodas and limit the size and caloric content of their other drinks in schools.[118] Under this agreement, only "bottled water, unsweetened juices and lowfat or nonfat milk products" would be sold in elementary and middle schools, and only "diet soft drinks . . . sports drinks, juices, milk and water" would be sold in high schools.[119] One year later, though, beverage makers were able to quietly amend the agreement so that "water" for high school sales included fortified waters, drinks that can have up to 100 calories per 12 ounce serving.[120] The beverage industry pushed for this change because enhanced water sales had skyrocketed from $20 million in 2000 to $884.7 million in 2006.[121] The original agreement was suddenly denounced by the beverage industry as draconian because it served only to limit the industry's growth potential and ignored student needs.[122] Although this amendment did not fundamentally destroy the agreement, it weakened its effectiveness in combating student obesity because it provided students with access to another caloric drink, which was exactly what the voluntary agreement sought to restrict.

The fact that this amendment passed without much notice also illustrates the superior position business leaders have in pursuing their own financial agendas when there is no public pressure to act as a watchdog. The Internet companies that would be affected by an energy tax have an even greater likelihood to vigorously pursue their financial interests because, unlike beverage companies, Internet companies essentially have a captive market. Soft drinks are widely available such that students can obtain these drinks without using a school vending machine. In contrast, everyone must pay his or her Internet provider's fee in order to have legal access to the Internet. Thus, once public interest in energy efficiency fades, these Internet companies have little incentive to improve their energy efficiency because they have a guaranteed income from their customer base.

However, too much government regulation or taxation can have a negative effect on economic growth. Mandating that corporations invest in energy efficiency, however, will most likely have a positive rather than negative economic impact. A 1993 DOE report showed that *if* one were to make the requisite investments to reduce American indus-

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118. Betsy McKay, *Beverage Firms Yield to Pressure on School Sales*, WALL ST. J., May 4, 2006, at D6.

119. *Id.*

120. Jane Zhang, *Drink Makers Expand Offerings in Schools*, WALL ST. J., Aug. 20, 2007, at B2.

121. *Id.*

122. *Id.*

try waste by just ten to twenty percent, such investments would "generate a cumulative increase of $2 trillion in the gross domestic product from 1996 to 2010. By 2010, the improvements would be generating 2 million new jobs."[123] The aforementioned examples of Denmark and California demonstrate the accuracy of this report's findings. Reasonable energy taxes can thus be a pro-growth economic policy.

Also, because energy efficiency can be achieved through simple measures and can yield large profits, there should not be a need for government subsidies. Corporations should be able to self-finance the installation of these smaller measures without undue hardship. The savings that materialize should then enable a corporation to self-finance larger-scale energy efficiency projects, whose return savings will more than likely cover their investment costs and finance other energy savings projects.[124] Furthermore, with new technologies constantly allowing for greater energy savings, determining what to subsidize could become complicated. Subsidies may also stifle corporate innovation with respect to finding new ways to save energy by drawing attention to the subsidized item and focusing on its implementation.[125] Such narrow focus diminishes the subsidy's effectiveness, which is inherently better achieved when the corporation is broadly looking for ways to reduce its energy bill. Thus, an energy tax is merely a way to force corporations to constantly address the issue of energy efficiency by making inefficiency more costly.

An Internet energy tax alone may be criticized because it addresses the issue of energy efficiency in just one segment of our economy, rather than comprehensively addressing all industries. The Supreme Court, though, has repeatedly recognized that Congress has the authority to legislate in the manner it so chooses, thus rendering this argument meritless.[126] Moreover, unlike market forces, this tax will at least insure that an entire industry is pursuing energy efficiency rather than just a handful of innovative companies. However, the Internet companies may object to this proposal on fairness grounds and argue that it arbitrarily and capriciously singles them out when all industries waste energy and the Internet is far from the most wasteful. While it is true that an energy tax can, and ideally should, be applied to all industries, an energy source is the Internet's

123. Romm, *supra* note 64.

124. *See id.*

125. *Id.*

126. Massachusetts v. EPA, 549 U.S. 497, 499 (2007) ("Agencies, like legislatures, do not generally resolve massive problems in one fell swoop . . . but instead whittle away over time, refining their approach as circumstances change and they develop a more nuanced understanding of how best to proceed . . . ." (internal citations omitted)); Williamson v. Lee Optical of Okla., Inc., 348 U.S. 483, 489 (1955) ("[A] reform may take one step at a time, addressing itself to the phase of the problem which seems most acute to the legislative mind.").

primary requirement.[127] An energy-efficient Internet provides unique benefits. These benefits are then strong grounds to argue that steps must be taken to ensure that the Internet is at the forefront of this energy reform movement.

The Internet is at least partially responsible for helping reduce U.S. energy needs in the 1990s during a booming economy, which is usually associated with greater energy consumption.[128] One way in which it helped reduce U.S. energy consumption was through e-materialization, the process by which things are handled online rather than in hardcopy.[129] This process thereby reduces paper manufacturing, one of the most energy and resource intensive processes in the economy.[130] While the Internet's current contributions to greater energy-efficiency are commendable, there are always new ways to invest in greater energy efficiency. Energy resources, after all, are finite in supply and therefore must be conserved. Furthermore, the Internet, as the epitome of technological creations, should be the industry with the greatest capacity to adapt to energy-saving technological changes. Thus, Internet companies appear to be the perfect "guinea pig" to test this tax proposal before it is expanded to businesses in general, especially when this industry is currently protected from other tax burdens.[131]

V. AN INTERNET ENERGY TAX PROPOSAL

In order to achieve Internet energy efficiency, this energy tax could be structured as follows. The federal government should impose a gasoline-like excise tax upon all Internet service providers and network companies such as AT&T, Comcast Cable, and others. This tax shall be an additional expense that these companies will pay on their overall energy bill. This charge will reflect the amount of energy the company uses to run the equipment that powers and maintains the Internet. This tax structure should ideally insure that the tax does not unduly burden small businesses because they use less energy and thus will pay less tax. Calculating how much this additional fee will be is difficult because, as mentioned above, there is uncer-

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127. *See* KOOMEY, *supra* note 7, at 6.

128. Cool-Companies.org, Energy & the Internet: Internet, New Economy Technology Yield Dramatic Energy and Environmental Savings, http://www.cool-companies.org/energy/debunk.cfm (last visited Aug. 27, 2010).

129. JOSEPH ROMM ET AL., THE INTERNET ECONOMY AND GLOBAL WARMING: A SCENARIO OF THE IMPACT OF E-COMMERCE ON ENERGY AND THE ENVIRONMENT 38 (1999), *available at* http://www.p2pays.org/ref%5C04%5C03784/0378401.pdf; *but see* Gerry Bayne, Cyberinfrastructure in a Carbon-Constrained World (Nov. 25 2009), http://www.educause.edu/blog/gbayne/SessionCyberinfrastructureinaC/191981.

130. *Id.*

131. *See* Jones, *supra* note 22.

tainty as to how much energy the Internet consumes.[132] Thus, in order to better assess the tax, these companies would first have to install monitoring devices, like those recording how much electricity, water, and gas individual homes consume, that measure their Internet equipment's energy consumption.[133]

While there may be some difficulty in determining an appropriate tax rate, this determination is not central to the tax because its intent is not to raise revenue, but to make the Internet energy efficient. The number just needs to be enough to make corporations seriously examine ways to improve energy efficiency. This objective could possibly be reached by establishing the tax so that it also self-credits, up to the entire amount of the tax, any investments a corporation makes towards energy efficiency. This self-credit will ideally foster corporate innovation and flexibility in meeting its annual energy efficiency mandate.[134] The company would accordingly have to provide the government with a long term plan, in which its Internet energy efficiency is ultimately improved, in order to qualify for this self-credit. The corporation should then be able to structure the investments so that they are not burdensome and provide the highest return to the company.

Such flexibility is particularly important for Internet companies because improving the Internet's energy efficiency involves much more than changing light bulbs.[135] For example, in their article *Greening the Internet*, Maruti Gupta and Suresh Singh argue that greater use of sleep modes for Internet components not in use can significantly improve the Internet's energy efficiency.[136] While this approach seems promising, the authors do not mention how much its implementation costs would be in terms of both time and money, but these costs are likely high given the number of variables in this ap-

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132. *See generally* KOOMEY, *supra* note 7, at 1 (discussing the common speculation that occurs in discussions concerning how much energy the Internet uses). While an estimated energy consumption range does exist, the consensus among studies is towards the lower end of the spectrum. The study that reached the 13% figure is widely seen as an inflated value. However, this study—the Mills and Huber project—was heavily cited by the media, which then lent credibility, in the general public's mind, to the idea that the Internet is a mammoth power consumer. Mitchell-Jackson, *supra* note 4, at 12-15.

133. As mentioned above, the EPA's forthcoming Energy Star ratings for data centers may make such assessments easier and possibly make the installation of such monitoring devices unnecessary. *EPA to Begin Energy Star Ratings for Data Centers*, *supra* note 7.

134. Though beyond the scope of this paper, it must be mentioned here that the inclusion of this self-credit provision would also differentiate this energy tax from already existing energy taxes such as Florida's sales tax on non-residential sales of electricity and its gross-receipt tax on all sales of electricity. *See generally supra* note 22 and accompanying text.

135. *See* Gupta & Singh, *supra* note 47; USF Energy-efficient Internet Project, http://www.csee.usf.edu/~christen/energy/main.html (last visited Aug. 27, 2010); Enrico Rantala et al., Modeling Energy Efficiency in Wireless Internet Communication (Aug. 17, 2009), http://conferences.sigcomm.org/sigcomm/2009/workshops/mobiheld/papers/p67.pdf.

136. Gupta & Singh, *supra* note 47, at 20-25.

proach.[137] If an energy tax proposal were to force Internet companies to immediately begin implementing Gupta and Singh's proposal, the companies would probably elect to pay the tax and pass its cost off to consumers because paying the tax would likely be cheaper. However, under the aforementioned self-credit provision, the company could take various "small actions [that] can add up to big savings," which could then fund the more costly energy saving projects."[138]

Again, the goal of this tax is not to raise revenue for the government, but it is likely that some revenue will be collected should an Internet company decide to annually pay this tax rather than invest in energy efficiency. Any revenue that is raised could then be placed into an energy fund similar to the Universal Service Fund that was established by the US Telecommunications Act of 1996 to try to expand Internet access into rural and underserved areas by subsidizing access rates.[139] Another possible use of any generated revenue is to earmark it for financing improvements on the nation's electrical grid making it similar to California's because such changes are an expensive but integral part of making meaningful progress towards energy efficiency.[140]

VI. CONCLUSION

The importance of energy efficiency is common knowledge, and thus any and all measures that can help lead to greater energy efficiency should be explored. As shown above, the tax code is one measure that can help the United States make meaningful and consistent progress towards this objective, and it is perhaps the most effective. The tax code, however, is under-utilized with regard to penalizing inefficient energy usage. This under-utilization must change. Given the dangers posed by climate change, the potential for another energy crisis, and the current state of the U.S. economy, this under-utilization should change now. The results could rival the societal and economic revolutions that the Internet itself sparked in the 1990s.

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137. *Id*. at 22 (describing the difficulties involved in maximizing the energy savings of this approach such as insuring that an Internet component can sleep long enough so the additional amount of energy it takes to reawaken the component is offset by the amount saved).

138. Tribble, *supra* note 65.

139. Heather E. Hudson, *Universal Access: What Have We Learned from the E-rate?*, TELECOMM. POL'Y, Apr. 1, 2004, at 309, *available at* http://intel.si.umich.edu/tprc/papers/2002/119/tprc02eratehudson.htm.

140. Though the process of nationalizing California's energy standards is beyond the scope of this paper, the federal government would obviously be heavily involved in such a large-scale project. The legislative process, however, is notoriously cumbersome, and given the evident complexity that changing the nation's energy grid entails, passing the necessary legislation for this project will be difficult. This difficulty is, in itself, another reason to pass an energy tax because it is a much simpler approach and thus potentially easier to enact. The process towards energy efficiency can then at least begin while the more complex issues are hammered out.