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NUCLEAR VS. BIG SOLAR: GOVERNMENT FUNDING OF 21ST CENTURY ENERGY PRODUCTION

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The government incentivizes investment in carbon-free energy production facilities by creating tax schemes designed to make renewable energy more attractive for investors. The Energy Policy Act of 2005 created a number of tax incentives for nuclear facilities, including one tax credit based on the amount of electricity produced at the facility. The Energy Policy Act also created new incentives for solar energy production. In 2008, as part of the "bailout" of the foundering financial sector, the Energy Improvement and Extension Act of 2008 was made law. This extended the deadline on some tax incentives for solar energy facilities, but failed to increase the timelines of other solar tax incentives. Because of the 2008 law, investment in nuclear energy facilities is now more highly incentivized than the same investment in solar energy. Eliminating this disparity will encourage an even-handed approach toward innovation in carbon-free energy production.

I. INTRODUCTION

If you have looked at your electricity bill recently, you know that energy production is a big, expensive business.[2] For many years, the government has been subsidizing utility companies that produce electricity.[3] Nuclear energy facilities[4] receive much aid

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[2] For example, providing electricity to the author's modest one-bedroom apartment costs more than $120 every month.

[3] *See, e.g.*, I.R.C. § 45J (2006) (creating tax credits for "advanced nuclear power facilities" based on production).

[4] Nuclear energy facilities use the energy created by splitting atoms apart to turn water into steam which is used to drive electricity-producing turbines. Nuclear energy facilities supply nearly twenty percent of the electricity used in the U.S. *See generally* Nuclear Energy Institute—Nuclear Power Plants,

from the government in a variety of forms, one of the oldest of which is the Price-Anderson Act of 1957, codified as 42 U.S.C. § 2210. The Price-Anderson Act creates a system of indemnification.[5] Industry funds cover the costs of catastrophic nuclear accidents up to a statutorily defined limit.[6] The government covers the remaining costs.[7] This is only an example of the many ways in which nuclear energy is given subsidies and tax incentives by the government. However, nuclear facilities are not the only form of energy-generation installation that benefit from government subsidies.

On October 3, 2008, President George W. Bush signed into law H.R. 1424.[8] The bill, commonly referred to as the financial industry "bailout,"[9] includes the Energy Improvement and Extension Act of 2008 (EIEA).[10] Among other things, the EIEA extends some tax credits for investments and production of solar facilities.[11] However, the EIEA does not go far enough to encourage investment in solar energy. As the law currently stands,

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http://www.nei.org/resourcesandstats/nuclear_statistics/usnuclearpowerplants/ (last visited Nov. 12, 2008) (on file with the North Carolina Journal of Law & Technology).

[5] 42 U.S.C. § 2210 (2006).

[6] *Id.*

[7] *See id.* Nuclear energy facilities are required to have liability insurance, and, should a nuclear accident occur, to pay a statutorily defined contribution into a common fund. In case of a nuclear accident, the facility's liability is limited to the value of its insurance policy and its contribution into the common fund, with the balance covered by government funds.

[8] Press Release, The White House, President Bush Signs H.R. 1424 Into Law (Oct. 3, 2008), http://www.whitehouse.gov/news/releases/2008/10/20081003-17.html (last visited Oct. 21, 2008) (on file with the North Carolina Journal of Law & Technology).

[9] Morrison & Foerster LLP, *Bailout Bill Tax Provisions—An Executive Summary*, MONDAQ, Oct. 8, 2008, http://www.mondaq.com/article.asp?articleid =67438 (last visited Oct. 21, 2008) (on file with the North Carolina Journal of Law & Technology).

[10] *Id.*

[11] *See, e.g.*, Energy Improvement and Extension Act of 2008, Pub. L. No. 110–343, Div. B, § 101(a)(2), 122 Stat. 3765, 3807 (2008) (extending a tax credit for energy production via solar energy until Jan. 1, 2011).

nuclear energy is much more incentivized than solar energy. Consequently, investment is not encouraged in a healthy, unbiased manner, but rather is driven toward a presupposed outcome. To better encourage innovation in non-fossil-fuel electrical generation, the tax incentive schemes for nuclear, solar, and other carbon-free energy sources should be brought into parity.

This Recent Development explores the differences between the manner in which solar energy and nuclear energy are aided and subsidized by the government and argues that the law should be changed to make investments in solar and nuclear energy equally attractive to public utility companies and their investors. Part II of this article examines the current tax incentives for nuclear facilities. Part III describes the EIEA's effects on tax credits for solar energy and what the changes in the EIEA mean for the solar energy market. Part IV compares the tax incentives for nuclear and solar energy. Finally, Part V advocates a change in federal law that will bring the two methods of energy production into parity.

II. TAX INCENTIVES FOR NUCLEAR ENERGY

In August 2005, Congress passed the Energy Policy Act of 2005 with the stated purpose of "ensur[ing] jobs for our future with secure, affordable and reliable energy."[12] The Act gave nuclear facilities several new tax incentives.[13] The cost of the act was estimated at $14.5 billion.[14]

One of the incentives created by the Energy Policy Act of 2005 is a tax credit based on the amount of electricity produced at the facility.[15] The tax credit applies to advanced nuclear facilities[16]

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[12] Energy Policy Act of 2005—Preamble, Pub. L. No. 109-58, 119 Stat. 594 (2005).

[13] *See id.*

[14] *US Energy Bill Favours New Build Reactors, New Technology*, NUCLEAR ENGINEERING INT'L, Aug. 12, 2005, http://www.neimagazine.com/story.asp?sectioncode=132&storyCode=2030325 (last visited Oct. 22, 2008) (on file with the North Carolina Journal of Law & Technology).

[15] I.R.C. § 45J (2006). The annual tax credit is calculated by multiplying $0.018 by the number of kilowatt-hours (kWh) produced at the facility during

that are brought online between August 8, 2005 (the date of the passage of the Act) and January 1, 2021.[17] This amount is capped annually at $125,000,000.[18] To achieve this maximum credit, a plant must generate approximately 6944 GWh per year once it comes online.[19] This is not an unreasonably large amount. As an example, Shearon Harris Nuclear Power Plant (Shearon Harris) in New Hill, North Carolina, which operates a 900 MW reactor, generated over 7400 GWh in 2007.[20] Such a large tax credit represents a significant portion of the cost to bring a nuclear power plant online—in 1987 Shearon Harris cost $3.9 billion to construct and bring online.[21] Current cost estimates for new nuclear plants range from $4.9 billion[22] to $8.5 billion[23] for an approximately 1100 MW reactor. The production tax credit would allow the reactor owner to recoup between one-fourth and one-eighth of the

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the applicable year. The credit lasts for the first eight years a nuclear facility is in service.

[16] An advanced nuclear facility is defined as one which uses a reactor with a design that was approved by the Nuclear Regulatory Commission after December 31, 1993. *See* I.R.C. § 45J(d)(2) (2006).

[17] I.R.C. § 45J(d)(1)(B) (2006). Note that because it was completed and came online in 1987, Shearon Harris does not receive these subsidies. It is being used here merely as an example familiar to North Carolina.

[18] I.R.C. § 45J(c)(1) (2006).

[19] This figure is computed by dividing the $125,000,000 credit cap by $0.018/kWh credit rate and applying the conversion of 1,000,000 kWh/GWh.

[20] Shearon Harris Nuclear Generating Station, Energy Information Administration, Oct. 3, 2008, http://www.eia.doe.gov/cneaf/nuclear/page/at_a_glance/reactors/shearonharris.html (last visited Oct. 22, 2008) (on file with the North Carolina Journal of Law & Technology).

[21] John Murawski, *Triangle Picked as Nuclear Site*, RALEIGH NEWS & OBSERVER, Jan. 24, 2006 at A1.

[22] *Another AP1000 EPC Contract—Almost*, NUCLEAR ENGINEERING INT'L, June 2008, at 5, *available at* http://www.neimagazine.com/story.asp?sectionCode=132&storyCode=2049832 (last visited Nov. 19, 2008) (on file with the North Carolina Journal of Law & Technology).

[23] Steve Kidd, Comment, *Escalating Costs of New Build: What Does It Mean?*, NUCLEAR ENGINEERING INT'L, August 2008, at 12, *available at* http://www.neimagazine.com/story.asp?sectioncode=147&storyCode=2050690 (last visited Nov. 19, 2008) (on file with the North Carolina Journal of Law & Technology).

construction costs, assuming that the owner can receive the whole $125,000,000 annual credit for the full eight years.

In addition, the Energy Policy Act of 2005 allowed the Secretary of Energy to guarantee loans for certain emission-lowering energy projects.[24] The Secretary can guarantee the loans for up to eighty percent of the costs of new energy projects, so long as those projects "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases."[25] Nuclear power plants emit no greenhouse gases[26] and are thus eligible for these loan guarantees. This drastically reduces the potential risk utilities-investors might face when investing in a new nuclear facility. According to the statutory language that creates the loan guarantee program, solar and other renewable facilities are also able to apply for the guarantees.[27] The rules establishing the loan guarantee program were finalized on October 23, 2007.[28] As of the publication of this Recent Development, no applications for loan guarantees have been granted.[29]

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[24] Energy Policy Act of 2005, Pub. L. No. 109–58, § 1701, 119 Stat. 1117 (2005); 42 U.S.C. § 16511–16515 (2006).

[25] Energy Policy Act of 2005, Pub. L. No. 109–58, § 1703(a)(1) (2005); 42 U.S.C. § 16513(a)(1) (2006). This loan program is available only to renewable-energy facilities, such as nuclear or solar, which use technology that is in operation in fewer than three other U.S. energy facilities—this highly encourages innovations in energy technology. *See* 10 C.F.R. § 609.2 (2007).

[26] RONALD E. HAGEN ET. AL., U.S. DEPT. OF ENERGY, IMPACT OF U.S. NUCLEAR GENERATION ON GREENHOUSE GAS EMISSIONS 4 (2001), *available at* http://tonto.eia.doe.gov/ftproot/nuclear/ghg.pdf (last visited Oct. 29, 2008) (on file with the North Carolina Journal of Law & Technology).

[27] *See* 42 U.S.C. § 16513(b)(1) (2006).

[28] Loan Guarantees for Projects That Employ Innovative Technologies, 72 Fed. Reg. 60,116 (Oct. 23, 2007) (to be codified as 10 C.F.R. pt. 609).

[29] *See* Department of Energy—Loan Guarantee Program, http://www.lgprogram.energy.gov/ (last visited Nov. 19, 2008) (on file with the North Carolina Journal of Law & Technology).

III. TAX INCENTIVES FOR SOLAR ENERGY AND CHANGES IN LIGHT OF THE EIEA

There are two major tax incentives that encourage the generation of solar energy. The first is a production credit similar to the one discussed previously for nuclear facilities.[30] The tax credit, in Section 45 of the Internal Revenue Code, is calculated by multiplying $0.015 by the number of kilowatt-hours produced annually during the first ten years of production at a qualified facility.[31] This credit applies to facilities which use one of several types of renewable energy sources, including solar energy.[32] Unlike the nuclear facility production credit, there is no annual cap for renewable energy production. However, this production credit does not apply to any new solar power facilities—it only applies to solar power facilities put into service between 2004 and 2006.[33] While the EIEA extended the service-entry dates by two years for many of the tax credits created by section 45,[34] it did not extend the production credit for solar energy. Whether this omission was intentional or a drafting mistake is unclear.[35] Nonetheless the result is that the production credit does not create any incentive for new investments into solar energy facilities.

The second major tax incentive for solar energy investment is the so-called energy credit in § 48 of the Internal Revenue Code. This section creates a tax credit for investments in solar energy

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[30] *See supra*, notes 15–19 and accompanying text.

[31] I.R.C. §§ 45(a) & (b)(4)(B)(i) (2006).

[32] I.R.C. § 45(c)(1) (2006) (including other qualifying sources such as wind energy, geothermal energy, etc.)

[33] *See* I.R.C. § 45(d)(4).

[34] Energy Improvement and Extension Act of 2008, Pub. L. No. 110–343, Div. B, § 101(a)(2), 122 Stat. 3765, 3808 (2008).

[35] Solar and geothermal energy are dealt with in the same clause, in I.R.C. § 45(d)(4) (2006). The date which sets the cut-off for the geothermal production credit is mentioned in the primary text of the clause and is changed by the Energy Improvement and Extension Act of 2008, Div. B, § 101(a)(2), 122 Stat. 3808 (2008). However, the date governing the solar production credit is mentioned parenthetically. In drafting, it would be very easy to overlook this difference and inadvertently leave out an extension for solar energy while extending the dates for most other forms of carbon-free energy.

property that is equal to thirty percent of the energy output of the purchased property.[36] In this instance, property refers to "equipment which uses solar energy to generate electricity," i.e. the tax credit does not apply to the land for a solar power plant, but the equipment needed to run that plant.[37] This tax credit is tremendously helpful in terms of reducing one of the biggest obstacles in bringing renewable energy sources to fruition—construction costs. An example of the start-up costs facing solar energy can be found in California, where Pacific Gas & Electric (PG&E) recently signed a twenty-year deal with solar facility contractor Ausra to construct a 177 MW[38] solar energy plant.[39] While the current price tag for the plant is still unknown, estimates put the cost at "half a billion dollars or more."[40]

Before the EIEA, the energy credit only applied to facilities entering service prior to January 1, 2009.[41] With the passage of the EIEA, the final put-into-service date for this credit was pushed back significantly, to January 1, 2017.[42] However, a facility cannot take advantage of this credit if that facility was taking or had taken advantage of the tax incentives created by Sec. 45.[43] In other words, if a facility had received tax credits for production, then the facility cannot receive tax credits for investments into expansion. While this untenable tax policy only applies to plants

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[36] I.R.C. § 48(a)(2) (2006).

[37] I.R.C. § 48(a)(3)(A)(i) (2006).

[38] Compare the size of this solar facility with the 900 MW reactor at Shearon-Harris. *See supra* note 20 and accompanying text.

[39] Todd Woody, *Solar Energy: Not Just for Electricity*, GREEN WOMBAT, Oct. 23, 2008, http://greenwombat.blogs.fortune.cnn.com/2008/10/23/solar-power-not-just-for-electricity/ (last visited Nov. 23, 2008) (on file with the North Carolina Journal of Law & Technology).

[40] *Id.* This price for a solar plant is comparable, in terms of cost per kW of capacity, to the current cost estimates for newly built nuclear energy facilities. *See supra*, notes 22–23 and accompanying text.

[41] I.R.C. § 48(a)(2)(A)(i)(II) (2006).

[42] Energy Improvement and Extension Act of 2008, Div. B, § 103(a)(1), 122 Stat. 3765, 3811 (2008).

[43] "[Energy property] shall not include any property which is part of a facility the production from which is allowed as a credit under section 45 for the taxable year or any prior taxable year." I.R.C. § 48(a)(3) (2006).

put into service between 2004 and 2006,[44] it is demonstrative of the inconsistent approach Congress has taken toward solar energy.

IV. NUCLEAR INCENTIVES, SOLAR INCENTIVES, AND THE TICKING CLOCK

The tax incentives for investment in solar energy are substantially similar to those for investment in nuclear power facilities. The gap between the two sets of incentives, however, is evident in the details. Time is the biggest obstacle preventing solar facilities from claiming these tax incentives.[45] There can be several years between the decision to build a power plant and that plant coming online, regardless of its power source.[46] Shearon Harris[47] was completed and the plant's one reactor came online in 1987,[48] but the project was being discussed as a four-reactor plant as early as 1981.[49] When faced with such long time-horizons, utility companies and their investors need certainty that their investments will pay off. Nuclear power benefits from tax incentives with much longer timelines. For example, the indemnification scheme created by the Price-Anderson Act,[50] has already been extended through the end of 2025.[51] The production credit for nuclear facilities[52] applies to power plants put into

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[44] *See supra* note 33 and accompanying text.

[45] Todd Woody, *Congress Sets Stage for Solar Boom*, GREEN WOMBAT, Oct. 3, 2008, http://greenwombat.blogs.fortune.cnn.com/2008/10/03/congress-sets-stage-for-solar-boom/ (last visited Nov. 23, 2008) (on file with the North Carolina Journal of Law & Technology) (noting the "years' long slog it takes to get large-scale power plants and other projects online").

[46] *Id.*

[47] *See supra* note 20 and accompanying text.

[48] Nuclear Plants—Progress Energy, http://www.progress-energy.com/aboutenergy/powerplants/nuclearplants/index.asp (last visited Nov. 23, 2008) (on file with the North Carolina Journal of Law & Technology).

[49] Robert Burns, *Nuclear Power Plant Problems Put More Risk in Utility Investments*, ST. PETERSBURG TIMES (St. Petersburg, Florida), Dec. 26, 1983, at 12E.

[50] *See supra* note 5 and accompanying text.

[51] 42 U.S.C. § 2210(c) (2006).

[52] *See supra* notes 15–19 and accompanying text.

service before January 1, 2021.[53] On the other hand, newly built solar energy facilities cannot take advantage of any similar production credits,[54] and the energy investment credit was only extended by the EIEA for another nine years to 2017.[55] Because of the longer timelines associated with the applicable tax incentives, owners of nuclear energy facilities that are currently in the early stages of planning may be more likely than owners of solar energy plants to be able to take advantage of the applicable tax incentives. With its shorter timelines, solar energy is left in the dark.

The other difference between the two tax schemes lies in their modes of encouragement. As mentioned earlier, both solar and nuclear facilities can take advantage of loan guarantees of up to eighty percent of the costs of a new energy facility, assuming the facility meets rather strict guidelines.[56] In addition, solar energy facilities have an opportunity to take advantage of the thirty percent solar energy investment credit based on the value of investments in new energy property and equipment.[57] However, this credit is not ongoing—it is only a one-time credit.[58] Nuclear facilities, on the other hand, can get ongoing government subsidies in the form of production tax credits.[59] Again, these differences tip the playing field in favor of nuclear energy over renewables.

V. ENERGY IS ENERGY IS ENERGY: BRING CARBON-FREE ENERGY SOURCES INTO PARITY

There are two questions one must ask when deciding on government policy toward new technologies. First, what should the government aim to achieve? When it comes to new technologies in energy production, the goal should be cleaner, safer, and more efficient methods of producing the incredible

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[53] I.R.C. § 45J (d)(1)(B) (2006).
[54] *See supra* notes 31–33 and accompanying text.
[55] *See supra* notes 36–37 and accompanying text.
[56] *See supra* notes 24–29 and accompanying text.
[57] *See supra* notes 36–37 and accompanying text.
[58] I.R.C. § 48 (2006).
[59] *See supra* notes 15–19 and accompanying text.

amounts of energy consumed on a daily basis. The second, and often more difficult, question is how can the government best help to achieve that goal? The primary focus of government policy in this area should be on aiding the market and encouraging investment in technologies that may not be as profitable now as some might hope, but that require initial investments for long term progress. Yet, while encouraging investment in these new technologies, government should not encourage one field of inquiry more than others. To do so is to essentially put all other technologies on the back-burner while one method gets all of the attention. To favor one technological approach over another is to presuppose that the favored technology is a more promising solution. Government should instead try to invest in new energy technologies with an eye toward incentivizing equally across types as opposed to favoring one sector over another. This approach will allow the market to sort out the most efficient method of achieving carbon-free energy while removing any governmental bias.

VI. CONCLUSION

Unfortunately, when it comes to energy tax policy, the government has created a biased set of tax incentives by encouraging more investments in nuclear power than in renewable energy sources like solar energy. The government must rectify this problem. Congress needs to bring the tax incentives for all carbon-free energy sources into parity, either by increasing the timelines of the incentives for renewables and by reestablishing the production credit for solar energy, or, preferably, by eliminating the differences between tax incentives for nuclear energy and renewable energy and bringing all carbon-free energy sources under one set of equal tax provisions. Until this happens, the dreams of a truly carbon-free energy system will remain merely dreams.