

FEDERAL INCENTIVES FOR CLEAN ENERGY AFTER SOLYNDRA: A POST-RECOVERY ACT PRECIPICE

JOHN A. HERRICK* & CARA S. ELIAS**

I.	INTRODUCTION.....	628
II.	FEDERAL NON-TAX INCENTIVE PROGRAMS	630
A.	TYPES OF FEDERAL INCENTIVES FOR CLEAN ENERGY	630
1.	<i>PURPA Renewable Power Purchase Requirements</i>	630
2.	<i>Federal Financial Assistance Programs for Clean Energy</i>	632
3.	<i>U.S. Department of Energy (DOE) Cooperative Agreements</i>	635
4.	<i>DOE Technology Investment Agreements</i>	637
5.	<i>Federal Loan Guarantees</i>	638
6.	<i>Rights to Intellectual Property Under Federal Incentive Programs</i>	640

* John A. Herrick is Senior Counsel in the Denver office of Brownstein Hyatt Farber Schreck LLP where he specializes in the clean technology practice area. Mr. Herrick has over 30 years experience in assisting private companies and public entities in developing clean energy, including wind, solar, geothermal, bioenergy, smart grid and energy efficiency projects. Prior to joining the Brownstein firm, Mr. Herrick was Chief Counsel with the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy in Colorado where he helped structure transactions totaling over \$5 billion for new technology energy production facilities, and helped form research and development partnerships with private industry, academia and the National Renewable Energy Laboratory. He is one of America's leading practitioners in assisting companies in entering into public and private partnerships in clean energy financing. An Adjunct Professor of Law at the University of Denver Sturm School of Law, Mr. Herrick teaches Renewable Energy & Project Finance, the first law course in the nation concentrating on renewable energy and is an avid speaker on these topics to the general public. He is an author of *The Law of Clean Energy: Efficiency and Renewables* (2011), the leading treatise in this area of law. Mr. Herrick is a graduate of the UND School of Law.

** Cara Elias is a Director in the Post-Closing Claims Group of Shareholder Representative Services LLC in Denver. Prior to joining Shareholder Representative Services, Cara was an attorney in the corporate group at Brownstein Hyatt Farber Schreck LLP in Denver, and in the tax group at Latham & Watkins LLP in New York, where she represented a wide variety of clients in planning and compliance matters related to tax, executive compensation and employee benefits matters, including recently passed healthcare reform requirements. Cara holds a J.D. from Columbia Law School, and a B.A. in history from the University of Oklahoma.

B.	INCENTIVE PROGRAMS FOR THE DEVELOPMENT AND COMMERCIALIZATION OF RENEWABLE ENERGY TECHNOLOGIES	641
1.	<i>Technology-Specific DOE Incentive Programs</i>	641
a.	DOE's Office of Energy Efficiency and Renewable Energy	641
b.	Solar Power Technologies	643
c.	Wind Power Technologies	643
d.	Geothermal Power Technologies.....	644
e.	Fuel Cell Technology	644
f.	DOE's Office of Electricity Delivery and Energy Reliability Program	645
2.	<i>The Energy Advanced Research Projects Agency</i>	645
3.	<i>U.S. Department of Agriculture Financial Assistance Programs for Renewable Energy Generation</i>	646
a.	USDA Rural Energy for America Program Grants .	646
b.	USDA Repowering Assistance Program.....	647
4.	<i>Bureau of Land Management Incentives for Renewable Generation</i>	648
C.	FEDERAL INCENTIVE PROGRAMS FOR THE DEVELOPMENT AND COMMERCIALIZATION OF RENEWABLE TRANSPORTATION FUELS	650
1.	<i>DOE Office of Biomass</i>	650
2.	<i>DOE/USDA Biomass Research and Development Initiative</i>	650
3.	<i>USDA Bioenergy Program for Advanced Biofuels</i>	651
D.	ENERGY EFFICIENCY FINANCIAL INCENTIVE PROGRAMS ...	652
1.	<i>DOE's State Energy Program</i>	652
2.	<i>DOE's Energy Efficiency and Conservation Block Grant Program</i>	653
3.	<i>Energy Efficiency Programs for American Energy- Intensive Industries</i>	654
4.	<i>DOE's Building Efficiency Technology Program</i>	654

5.	<i>Federal Energy Savings Performance Contracting</i>	655
E.	FEDERAL LOAN GUARANTEE PROGRAMS FOR CLEAN ENERGY PROJECTS.....	657
1.	<i>Title XVII Loan Guarantee Program—New and Innovative Clean Energy Technology Projects</i>	657
2.	<i>Recovery Act Loan Guarantee Program</i>	659
3.	<i>Department of Agriculture Loan Guarantee Programs for Biofuels</i>	661
a.	USDA Biorefinery Assistance Loan Guarantee Program	661
b.	USDA Rural Energy for America Loan and Loan Guarantee Program	663
F.	OTHER FEDERAL FINANCIAL INCENTIVES FOR THE DEVELOPMENT OF CLEAN ENERGY TECHNOLOGIES	664
1.	<i>Clean Renewable Energy Bonds (CREBs)</i>	664
2.	<i>Qualified Energy Conservation Bonds (QECBs)</i>	669
III.	FEDERAL TAX INCENTIVES FOR CLEAN ENERGY	670
A.	INTRODUCTION.....	670
B.	RENEWABLE ENERGY TAX CREDITS	672
1.	<i>Investment Tax Credit</i>	672
2.	<i>Production Tax Credit</i>	673
3.	<i>Manufacturing Tax Credit</i>	675
4.	<i>Grant in Lieu of Tax Credit</i>	677
C.	TAX INCENTIVES FOR RENEWABLE FUELS	678
D.	CHOOSING BETWEEN THE ITC, THE PTC, OR THE GRANT IN LIEU OF TAX CREDITS.....	681
E.	THE EFFECT OF THE AMERICAN RECOVERY AND REINVESTMENT ACT	684
F.	THE FUTURE OF FEDERAL TAX INCENTIVES FOR CLEAN ENERGY.....	685
G.	CURRENT LEGISLATION REGARDING FEDERAL TAX INCENTIVES.....	687

IV. CONCLUSION..... 689

I. INTRODUCTION

The political fallout resulting from the bankruptcy and default of Solyndra, the California solar panel manufacturer, under its Recovery Act-funded, United States Department of Energy-backed, \$535 million loan guarantee, has intensified the debate over continued federal involvement in clean energy development.¹ The post-Solyndra debate merely reflects just the current chapter of the long 150 year history of the federal government’s “tried and true” approach to drive energy innovation through a variety of incentive programs.² These incentives – first to coal, then to oil, further to nuclear, and now to renewables – have helped drive innovations in energy production and delivery, speed United States economic transitions, create cheap power and fuels for American consumption, and shape our national character and quality of life.³ Today, as we seek to move towards a more independent and clean energy future, the role of renewables – compared to the history of incentives to these other sources of energy – are, if anything, under-subsidized.⁴ America’s energy needs and priorities have changed over time, and they will continue to evolve going forward, driven by economics, environmental concerns, and security issues. If fallout from the Solyndra failure⁵ adversely affects these incentives, the infrastructure pathway to clean and independent energy could be delayed for a decade or more. Investments in energy infrastructure are capital intensive, and can

1. See *The Solyndra Failure: Views from DOE Secretary Chu Before the H. Energy & Commerce Comm.*, 112th Cong. (2011), available at <http://energycommerce.house.gov/hearings/hearingdetail.aspx?NewsID=9090> (discussing the Department of Energy’s (DOE) handling of the Solyndra Loan Guarantee); see also Olga Belogolova, *Insiders: Solyndra “Black Eye” for Renewables, Obama*, NAT’L J., Sept. 20, 2011, available at http://www.nationaljournal.com/energy/insiders-solyndra-black-eye-for-renewables-obama-20110920?mrefid=site_search&page=1; Eric Lipton & Clifford Krauss, *A Gold Rush of Subsidies in Clean Energy Search*, N.Y. TIMES, Nov. 11, 2011, available at <http://nytimes.com/2011/11/12/business/energy-environment/a-cornucopia-of-help-for-renewable-energy-html>; James Surowiecki, *A Waste of Energy?*, THE NEW YORKER, Oct. 10, 2011, at 42; Bryan Walsh, *Does the U.S. Spend Too Much on Green Energy—or Not Enough?*, TIME, Nov. 15, 2011, available at <http://www.time.com/time/printout/0,8816,2099480,00.html#>.

2. NANCY PFUND & BEN HEALY, WHAT WOULD JEFFERSON DO? THE HISTORICAL ROLE OF FEDERAL SUBSIDIES IN SHAPING AMERICA’S ENERGY FUTURE 34 (Sept. 2011), available at http://i.bnet.com/blogs/dbl_energy_subsidies_paper.pdf.

3. *Id.* at 6, 37.

4. *Id.* at 6.

5. As of this writing, the DOE Loan Program Office has entered into forty loan guarantees. Two of these loan guarantees have failed: Solyndra and Beacon Power, a battery company in upstate New York which borrowed \$39 million. These defaults represent just 1.3% of the \$37.6 billion loan portfolio. Editorial, *The Solyndra Mess*, N.Y. TIMES, Oct. 25, 2011, at A34.

last beyond seventy-five years; meaning delays in transitioning American energy infrastructure to these new technologies will have lasting and negative repercussions well into the twenty-first century.

In the realm of the clean energy sector of the United States economy, the American Recovery and Reinvestment Act of 2009⁶ (commonly referred to as the “Recovery Act”) was certainly a momentous event. It was either the breakthrough catalyst for development of an American clean energy infrastructure for this century, or it was the representation of the high point of clean energy financing for the next decade and beyond. Under the first scenario, the influx of over \$55.7 billion in federal financing and tax credits⁷ to assist the private sector in investing in clean energy projects provided the technological and infrastructure groundwork for a competitive clean energy sector in a future global economy that is becoming more “hot, flat, and crowded.”⁸ Under the second scenario, the federal role was misplaced and wasted taxpayers’ dollars, suggesting the development of a clean energy sector should be left up to the marketplace using only private sector capital.

Which scenario will be undertaken by the federal government in this coming decade will depend on the strength of opposing political and economic perceptions, and both partisan and individual views on the extent of the role of government in the world’s energy markets. One thing is clear in this era of federal cutbacks: future investment in clean energy technologies in the United States will require more involvement of the private sector.⁹ What is not clear will be the extent of governmental incentives needed to encourage that investment. President Obama has indicated he will continue to stimulate clean energy development in a post-Recovery Act era.¹⁰ The 2012 election will determine if the American

6. Pub. L. No. 111-5, § 1, 123 Stat. 115, 115 (2009).

7. See *Spending Categories by Funds Awards*, RECOVERY, <http://www.recovery.gov/Transparency/Pages/DataExplorer.aspx?bk=fb1b1b13-b100-49d8-a960-e19fe34de7a9&t=U3B1bmRpbmcgQ2F0ZWdvcmlscyBieSBGdW5keyBBd2FyZGVk> (last visited Sept. 21, 2012) (providing synopsis of Recovery Act funding). The \$55.7 billion represents \$27.2 billion in direct funding for clean energy development and commercialization projects; \$6.5 billion in transmission infrastructure improvements; \$4.5 billion in smart grid research and development (R&D); \$4.5 billion in federal building efficiency improvements; and \$13 billion in tax credits for renewable energy production. *Id.*

8. THOMAS L. FREIDMAN, HOT, FLAT, AND CROWDED: WHY WE NEED A GREEN REVOLUTION – AND HOW IT CAN RENEW AMERICA 26-28 (2008).

9. JOSH FREED & MAE STEVENS, NOTHING VENTURED: THE CRISIS IN CLEAN TECH INVESTMENT 1 (2011), available at http://content.thirdway.org/publications/456/Third_Way_Report_Nothing_Ventured_The_Crisis_in_Clean_Tech_Investment.pdf.

10. Press Release, The White House Office of the Press Secretary, Remarks by the President on America’s Energy Security (Mar. 30, 2011), available at <http://www.whitehouse.gov/the-press-office/2011/03/30/remarks-president-americas-energy-security>.

people believe whether this sector is one that demands continued government attention and support.

This article provides the developer of clean energy technologies, and the legal practitioner in this burgeoning area, a guide to the federal programs that support the commercialization of clean energy technologies. The array of federal programs that provide various incentives, both tax and non-tax, can be confusing and daunting. Compiling these programs in one article will help crystallize which programs are beneficial to a particular technology, and which are either redundant or misplaced. The article uses the term “incentives” rather than “subsidies” because the latter term is a loaded term and belies the fact that, traditionally, the governmental involvement in all sectors of the energy sector has been to stimulate private sector investment, rather than the conventional wisdom of using it to pick winners and losers among energy resources.

II. FEDERAL NON-TAX INCENTIVE PROGRAMS

A. TYPES OF FEDERAL INCENTIVES FOR CLEAN ENERGY

1. *PURPA Renewable Power Purchase Requirements*

The first major federal regulatory support of renewable energy generation was the enactment of section 210 of the Public Utility Regulatory Act of 1978 (PURPA), which encouraged and incentivized the development of renewable power through independent power generation by establishing a guaranteed market for certain small renewable generators.¹¹ This law required electric utilities to buy power generated from qualified facilities using solar, wind, geothermal or biomass resources, up to eighty megawatts (MW),¹² at “just and reasonable” rates,¹³ and in a non-discriminatory manner.¹⁴ It also required public utilities to interconnect

11. 16 U.S.C. § 824a-3(a) (2006). *See generally* 18 C.F.R. pt. 292 (2011) (implementing § 210 regulations).

12. Section 210 of PURPA was amended a number of times, opening up its incentives to geothermal generators and changing various size limitations on the small renewable power generators. *See, e.g.*, Energy Security Act of 1980, Pub. L. No. 96-294, § 643, 94 Stat. 611, 770 (1979).

13. These rates are not to exceed the incremental cost to the electric utility representing the avoided cost of alternative electric power. *Am. Paper Inst., Inc. v. Am. Elec. Power Serv. Corp.*, 461 U.S. 402, 405, 417 (1983). State public utility regulatory bodies became the entities that oversaw the implementation of the pricing of sales in their respective states under this authority, which resulted in a variety of interpretations. *See* Bret L. Vanderlinde, *Bidding Farewell to the Social Costs of Electricity Production: Pricing Alternative Energy Under PURPA*, 13 J. CORP. L. 1011, 1024-30 (1988).

14. 16 U.S.C. § 824a-3(a)-(b). Utilities are also required to provide qualified facilities with necessary backup, interruptible, maintenance and supplemental power. *Id.*

with small renewable generators and supply backup at reasonable rates.¹⁵ The requirements allowed these qualified facilities to make sales of power without federal or state utility regulatory review and operate largely free from regulatory review of financial and corporate organization structure regimes.¹⁶ These regulatory benefits were instrumental in the establishment of a viable renewable power sector in the United States for the past thirty years.¹⁷

Notwithstanding the advances, this regulatory regime, as it evolved in the marketplace, was subject to much criticism in the energy industry, both inside and outside of the renewable sector.¹⁸ In response to this criticism, Congress, through the Energy Policy Act in 2005, modified section 210 to allow the mandatory purchase requirement to be terminated if the Federal Energy Regulatory Commission (FERC) found that a qualified facility has non-discriminatory access to the wholesale electric market.¹⁹ In 2006, FERC issued a Regulatory Order that, in effect, held if a qualified facility has access to transmission in a market administered by a regional transmission authority under an open access transmission tariff, it would consider that access non-discriminatory.²⁰ FERC found five regional transmission organizations afforded non-discriminatory market access to qualified facilities in their transmission service areas, thereby switching the burden of proving access discrimination to the small renewable generators in those service areas.²¹ The 2005 law and its implementation by FERC marked the beginning of the end for federal regulatory purchase mandates for renewable power, leaving the renewable power sector to rely on

15. *Id.* § 824a-3(a); *see* 18 C.F.R. § 292.303(a)-(c).

16. *See* 18 C.F.R. § 292.602.

17. *See, e.g.,* Steven Ferry et al., *Fire and Ice: World Renewable Energy and Carbon Control Mechanisms Confront Constitutional Barriers*, 20 DUKE ENVTL. L. & POL'Y F. 125, 140 (2010); James W. Moeller, *Of Credits and Quotas: Federal Tax Incentives for Renewable Resources, State Renewable Portfolio Standards, and the Evolution of Proposals for a Federal Renewable Portfolio Standard*, 15 FORDHAM ENVTL. L.J. 69 (2004).

18. *See generally* Richard D. Cudahy, *PURPA: The Intersection of Competition and Regulatory Policy*, 16 ENERGY L.J. 419 (1995); M. Hornstein & J. S. Gebhart Stoermer, *The Energy Policy Act of 2005: PURPA Reform, the Amendments and Their Implications*, 27 ENERGY L.J. 25, 31 (2006); Kenneth V. Wilson, *Electric Utility Deregulation: The Recovery of Stranded Costs*, 33 NEW ENG. L. REV. 557 (1999).

19. Energy Policy Act of 2005, Pub. L. No 109-58, § 1253, 119 Stat. 594, 967-70 (codified as amended at 16 U.S.C. § 824a-3(a)(m)). *See generally* Hornstein & Stoermer, *supra* note 18 (analyzing the PURPA Section 210 modifications).

20. *New PURPA Section 210(m) Regulations Applicable to Small Power Production and Cogeneration Facilities*, Order No. 688, 71 Fed. Reg. 64,342, 64,343 (Nov. 1, 2006) (to be codified at 18 C.F.R. pt. 292).

21. *Id.* at 64,344.

competitive market forces and other forms of federal renewable incentives as discussed in this section.²²

2. *Federal Financial Assistance Programs for Clean Energy*

The federal government provides assistance in many forms, financial and otherwise. Federal financial assistance programs are designed to serve a variety of purposes. Objectives may include fostering some element of national policy as directed by either the Executive or by Congress through statute; stimulating private sector involvement to achieve public purpose goals through mutually beneficial undertakings; or furnishing aid of a type or to a class of beneficiaries the private market cannot or is unwilling to otherwise accommodate.²³ The development and commercialization of clean energy technologies has been a national goal since the late 1970s through a series of overlapping and reinforcing energy legislation.²⁴ Because most of these statutory regimes require the federal government to work with the private sector to advance these technologies²⁵ and the technologies are not solely directed for government use, the appropriate funding vehicles for these activities are financial assistance agreements rather than federal procurement contracts.²⁶

Federal financial assistance was clarified by the Federal Grant and Cooperative Agreement Act in 1977,²⁷ which provides standards to

22. *E.g.*, Ferry et al., *supra* note 17, at 134-35.

23. *See generally* 2 U.S. GOV'T ACCOUNTABILITY OFFICE, PRINCIPLES OF FEDERAL APPROPRIATIONS LAW 10-1 to 10-144 (3d ed. 2004) [hereinafter RED BOOK] (discussing federal assistance with regard to grants and cooperative agreements).

24. There have been over twenty separate enactments of legislation since the 1970s, still operative, that establish federal research, development, demonstration, and commercialization programs for clean energy technologies. *See, e.g.*, Energy Independence and Security Act of 2007, Pub. L. No. 110-104, 121 Stat. 1492 (2007); Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2276 (1992); National Energy Conservation Policy Act, Pub. L. No. 95-619, 92 Stat. 3206, (1978); Energy Policy and Conservation Act, Pub. L. No. 94-163, 89 Stat. 871 (1975).

25. *See* John A. Herrick, *Federal Project Financing Incentives for Green Industries: Renewable Energy and Beyond*, 43 NAT. RESOURCES J. 77, 83-98 (2003).

26. Generally, federal funds can only be disbursed to non-federal entities through two separate transactional pathways: federal procurement contracts or federal financial assistance agreements. 31 U.S.C. §§ 6303-05 (2006). The correct legal instrument and pathway depend on what the purpose of the activity is and the relationship of the government to the participating non-federal entity. If the principal purpose of the activity is to acquire (by purchase, lease, or barter) property or services for the direct benefit or use of the United States government, the proper instrument is a procurement contract. *Id.* § 6303. If the activity is to carry out a public purpose of support or stimulation authorized by law, the proper instrument is a financial assistance agreement. *Id.* §§ 6304-05. *See generally* PAUL G. DEMBLING & MALCOLM S. MASON, ESSENTIALS OF GRANT PRACTICE LAW (1991).

27. Pub. L. No. 95-224, § 1, 92 Stat. 3, 3 (1977); *see also* 31 U.S.C. § 6301. The Act was the result of the 1972 report of the Commission on Government Procurement, which found confusion both within and outside the government over federal agency use of grant relationships versus procurement relationships. 3 REPORT OF THE COMMISSION ON GOVERNMENT PROCUREMENT 1-

distinguish between financial assistance and federal contracting actions and sets out the following two categories of financial assistance:

- *Grant agreements.* An agency is to use a grant agreement when the principal purpose of the relationship is to transfer a thing of value (money, property, services, etc.) to the recipient to carry out a public purpose of support or stimulation, authorized by a law of the United States.²⁸ Instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government, substantial involvement is not expected between the agency and the recipient when carrying out the contemplated activity.²⁹
- *Cooperative agreements.* This type of assistance is similar to grants, as discussed above, except that substantial involvement is expected between the agency and the recipient when carrying out the contemplated activity.³⁰

Notwithstanding the Federal Grant and Cooperative Agreement Act, a federal financial assistance program requires separate authorizing legislation to be able to provide the agency with the discretion to transfer federal money to a recipient for a public purpose.³¹ Normally, the program's organic statute provides the agency with guidance on the public purpose goals and can contain requirements and/or conditions for the award of financial assistance under the program.³² While a financial assistance agreement is not considered a government contract under federal procurement law,³³ the government and the courts will usually look to contract law principles to define the rights and obligations of the parties to a federal grant.³⁴ In

22 (1972). The Act was an attempt to distinguish financial assistance from procurement contracts and to further refine the concept of assistance by clearly distinguishing grants from cooperative agreements. Pub. L. No. 95-224, § 1, 92 Stat. 3,3 (1977).

28. 31 U.S.C. § 6304.

29. *Id.*

30. *Id.* § 6305.

31. RED BOOK, *supra* note 23, at 10-17.

32. *Id.*

33. In most instances, the Federal Acquisition Regulations (FAR), which governs federal procurement, is not applicable to federal financial assistance. *See generally* FAR pt. 1-53 (2010). Each agency formulates a separate regulatory regime for its financial assistance agreements, subject to guidance provided in Office of Management and Budget Circulars. *See, e.g.,* OFFICE OF MGMT. & BUDGET, OMB CIR. NO. A-122 (2004). For example, the Department of Energy's financial assistance regulations, which govern all of the DOE grant and cooperative agreements, is found at 10 C.F.R. pt. 600. Those separate regulations, in some instances, do incorporate certain aspects of the FAR into financial assistance. A prime example is DOE incorporation of the FAR's part 31 allowable costs principles into its financial assistance agreements. *See* 10 C.F.R. § 600.317 (2011).

34. RED BOOK, *supra* note 23, at 10-6. The U.S. Government Accountability Office (GAO) states that:

particular, a recipient must meet the conditions imposed by the federal government under the award of a financial assistance agreement in order to receive the federal funds. In this context, the conditions are analogous to contractual provisions.³⁵ The award of financial assistance can be accomplished through two types of financial distribution regimes. One is the categorical financial assistance agreement awarded to a specific recipient to undertake a specific activity.³⁶ The other is formula block grant awarded to a governmental unit, usually a state, allocated on a distribution formula prescribed by statute or regulation to be used for a variety of activities within a broad functional area.³⁷ Under these block grants, the state is responsible for further distribution of the money.³⁸

Except for programs directed at the states, most of the clean energy funding programs discussed in this article are discretionary and subject to a competitive process for award.³⁹ The Federal Grant and Cooperative Agreement Act encourages competition in assistance programs where the type of assistance is categorical in order to fund the best possible projects and to achieve the programmatic objectives.⁴⁰ However, most agencies do not have a forum for the protest of financial assistance awards.⁴¹ The U.S. Government Accountability Office (GAO)⁴² has declined to use its bid

[I]t is clear that the many varied rules and principles of contract law will not be automatically applied to grants. Nevertheless, it is equally clear that the creation of a grant relationship results in certain legal obligations flowing in both directions (grantor and grantee) that will be enforceable by the application of some basic contract rules.

Id. at 10-12.

35. *See generally id.* at 10-34 to -35 (discussing the effect of federal grant conditions).

36. Normally, a categorical grant is a discretionary award of the federal government under a statutorily authorized program. *Id.* at 10-60.

37. *Id.* at 10-60 to -61.

38. *Id.*

39. For example, the DOE's policy is to use a competitive, merit-based process in its discretionary grant programs:

[i]t is DOE policy to use competition in the award of grants and cooperative agreements to the maximum extent feasible. This policy conforms to [31 U.S.C. § 6301(3),] which encourages the use of competition in awarding all grants and cooperative agreements. Contracting Officers must use merit-based, competitive procedures to award grants and cooperative agreements to the maximum extent feasible.

DEP'T OF ENERGY, GUIDE TO FINANCIAL ASSISTANCE § 2.1.3 (June 2008), *available at* <http://energy.gov/sites/prod/files/GuidetoFinancialAssistance.pdf>; *see also* 10 C.F.R. § 600.13.

40. 31 U.S.C. § 6301(3) (2006).

41. However, a few agencies do provide a forum for the protest of grant awards. *See, e.g.*, USDA National Appeals Division, 7 C.F.R. pt. 11, subpt. A (2011).

42. Under various statutory and regulatory authorities, the GAO has served for more than eighty years as an independent forum for the resolution of disputes (commonly referred to as bid protests) concerning the award of federal contracts. *See, e.g.*, Robert S. Metzger & Daniel A. Lyons, *A Critical Reassessment of the GAO Bid Protest Mechanism*, 2007 WIS. L.R. 1225, 1234-1288 (2007).

protest mechanism, which is prescribed to ensure the fairness of awards of contracts, to rule on the propriety of individual grant awards.⁴³ This reluctance is primarily due to the view that the award of discretionary financial assistance is left to the applicable agency's expertise in its merit determination of the technologies being supported. An administrative appeals process would unduly override that technical expertise.

3. *U.S. Department of Energy (DOE) Cooperative Agreements*

Because the discretionary funding of non-federal entities by the U.S. Department of Energy (DOE) for the research, development, and commercialization of clean energy technologies is undertaken in concert with DOE programmatic direction and priorities, the appropriate funding vehicle has been cooperative agreements rather than grant instruments. The cooperative agreements allow the DOE to have substantial involvement in the project and better assure the DOE the appropriate technology is developed and demonstrated, and the public interest goals of commercialization are furthered.⁴⁴ DOE investment is done on a cost-sharing basis.⁴⁵ The DOE cannot provide a cost share above 80% of total project costs on any applied research and development activity,⁴⁶ or above 50% on demonstration and commercialization projects.⁴⁷ It is within the DOE's discretion to determine where a particular project falls.⁴⁸

DOE participation in a project through a cooperative agreement will trigger the need for a federal National Environmental Policy Act (NEPA)⁴⁹

43. See RED BOOK, *supra* note 23, at 10-26.

44. It is in this context the remaining part of this section will discuss cooperative agreements as the financial assistance vehicle. However, this discussion would be applicable to grants awarded by the federal government as the legal principles between the two remain the same.

45. 42 U.S.C. § 16352 (2006) (mandating non-federal cost sharing on clean energy financial assistance agreements).

46. *Id.* § 16352(b). The cost-sharing maximum for the DOE can be increased on a project-by-project basis if the Secretary of Energy determines it is "necessary and appropriate." *Id.*

47. *Id.* § 16352(c). The DOE maximum can be increased if the Secretary of Energy determines on a project-by-project basis it is "necessary and appropriate" due to "any technological risks" relating to the project. *Id.*

48. *Id.* In most instances, the DOE will solicit projects in a particular category in a competitive process by making Funding Opportunity Announcements (FOA) for either research and development efforts or separate FOAs for demonstration and commercialization efforts. This process allows projects within a specific technology area and the same stage of development to compete for the DOE funding and be able to more accurately assess the financial role DOE will play in the project.

49. National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-47. NEPA requires federal agencies to assess the environmental impact of all major federal actions significantly affecting the quality of the human environment. *Id.* § 4332. There are three types of review under NEPA: categorical exclusions (CX), environmental assessments (EA), and environmental impact statements (EIS). 40 C.F.R. §§ 1508.4, .9, .11 (2011). DOE's NEPA implementing regulations,

review of the project.⁵⁰ A commitment to provide federal funds for a project is sufficient to bring that project under NEPA purview. In many instances, a multi-phased project will be segmented into separate funding phases, with separate approvals. Having separate phases allows the project to initiate design and permit activity under a categorical exclusion, while allowing for a more strenuous NEPA review prior to subsequent phased funding of the developmental effort. As a general matter, formula block grants to states are an indirect use of federal funds and not subject to a federal NEPA review.⁵¹

Although federal cooperative agreements are not normal financing instruments in traditional energy project financing, project funds derived from this source can be treated by the project sponsor as developer equity in the project.⁵² The agreements also provide confidence to other equity and debt participants of the project's technological merit and feasibility. In many instances, the involvement of the DOE in the project actually attracts new financial support for the project from more traditional project-financing sources. One complication of the cooperative agreement instrument in project financing is its treatment of property acquired by the recipient under the agreement. Federal regulations require the government to retain an ownership interest in property acquired by the recipient (or sub-recipient) under the agreement.⁵³ The government retains the right for a pro rata share of the fair market value of such property at the termination of the agreement,⁵⁴ which could create a substantial burden on the recipient once the federal funding agreement concludes. The DOE, in recognition of this problem, has revised its standard clauses to assure recipients if they continue to use the property for similar, but commercial-like purposes, after

10 C.F.R. § 1021, specify actions that normally require an EIS or an EA, and actions that can be categorically excluded.

50. *See, e.g.*, *Blue Ocean Pres. Soc'y v. Watkins* (I), 754 F. Supp. 1450 (D. Haw. 1991). *See generally* DANIEL R. MANDELKER, *NEPA LAW AND LITIGATION* § 8:20 (2d ed. 2009).

51. *See* MANDELKER, *supra* note 50, § 8:20 (stating no federal review when block grants provide only indirect financing).

52. The Energy Policy Act of 2005 states the DOE "shall not require repayment of the Federal share" under the financial assistance agreement. 42 U.S.C. § 16352(e). Federal tax treatment of the federal portion of the cost share is dependent on how the federal funds will be used in the project. As a general matter, if the federal funds are authorized to be used by a corporate recipient under the agreement as a contribution to capital, it will not be treated as income for tax purposes; if the funds are not so authorized, it will be taxed as income. *See* I.R.C. § 118 (2009); Rev. Proc. 2010-20, 2010-14 § I.R.B 528.

53. 10 C.F.R. § 600.321(c).

54. *Id.* § 600.321(f).

expiration of the funding agreement, it will not exercise its right to realize on the property.⁵⁵

4. *DOE Technology Investment Agreements*

In an attempt to facilitate the commercialization of new energy technologies, Congress in 2005 provided the DOE with the authority to enter into transactions other than contracts, cooperative agreements, and grants (commonly called “other transactions” authority) to advance public benefits through private sector partnerships.⁵⁶ The DOE has implemented this other transactions authority by establishing a new contractual mechanism — the technology investment agreement (TIA) — as a new financing vehicle to move technologies in the clean energy marketplace.⁵⁷ TIAs are modeled after the Defense Advanced Research Projects Agency program that has spun off many successful commercial enterprises from the development of military technology.⁵⁸ The new TIA mechanism will facilitate the financing of facilities that will commercialize innovative technologies in those cases where cooperative agreements are not well suited.

Under TIAs, the project developer and the DOE provide funds on an even-sharing basis to pay for the costs of moving promising clean energy technologies into the commercial marketplace.⁵⁹ TIAs join federal funds with equity or debt contributions from the developer to construct pilot or commercial production facilities or to place products in the marketplace. The developer is not obligated to pay back the federal contribution.

Congress authorized TIAs to help bring new ideas and innovations to fruition, to attract nontraditional government contractors, and to advance the clean technology sector by promoting public-private partnerships. TIAs provide for more flexible terms and conditions than normal federal financing mechanisms, and the DOE has greater latitude to negotiate provisions that vary from traditional government contracts and financial assistance agreements. Traditional barriers to government supported

55. This is done through agency discretion, on a case-by-case basis through the DOE’s Golden and National Energy Technology Field Offices who negotiate and administer the agreements.

56. Energy Policy Act of 2005, Pub. L. No. 109-58, § 1007, 119 Stat. 594, 932 (2005) (codified at 42 U.S.C. § 7256). This authority is subject to reauthorization in fiscal year 2011.

57. DOE has promulgated a new part to its Assistance Regulations, 10 C.F.R. pt. 603, “Technology Investment Agreements” on May 9, 2006, modeled after Defense Advanced Research Projects Agency’s (DARPA) other transactions authority regulation, Defense Grant and Regulatory System, DoD 3210.6-R, pt. 37 (1998).

58. *Our Work*, DARPA, http://www.darpa.mil/our_work/ (last visited August 24, 2012).

59. 42 U.S.C. § 7256 (2006).

financing — including having to comply with federal cost accounting standards and traditional financial assistance regulations — are not applicable to TIAs.⁶⁰ The major factor that will influence the use of this instrument is the intellectual property statutes applicable to federal contracts and financial assistance are not applicable to TIAs. If a company that normally does not do business with the federal government has difficulty with the application of these laws on its ability to commercialize the subject technology, a TIA may provide the ability of that company to partner with the DOE.

5. *Federal Loan Guarantees*

Another major form of federal financial support is federal credit assistance, which includes direct loans, guaranteed, and insured loans. In essence, a federal guaranteed loan is an “advance of credit made to a borrower⁶¹ by a participating lending institution, where the United States government, acting through the particular federal agency involved, ‘guarantees’ payment of all or part of the principal amount of the loan, and often interest, in the event the borrower defaults.”⁶² The primary purpose of loan guarantees is to induce private lenders to extend financial assistance to borrowers who otherwise would not be able to obtain the needed capital on reasonable terms, if at all. In other words, federal loan guarantee programs are designed to redirect capital resources by intervening in the private market decision process “in order to further objectives deemed by Congress to be in the national interest.”⁶³ Advancement of American clean energy industries has been determined to be in the national interest.⁶⁴

60. Assistance Regulations, 71 Fed. Reg. 27, 156, 27,158-59 (May 9, 2006).

61. Depending on the particular federal program, the borrower may be a traditional private lending institution, private individual, business entity, the federal government through the Federal Financing Bank, a state or local government, hedge funds, or a state economic development bonding organization or other debt-like providers.

62. RED BOOK, *supra* note 23, at 11-3; *see also* 2 U.S.C. § 661a(3) (defining “loan guarantees” as “any guarantee, insurance, or other pledge with respect to the payment of all or a part of the principal or interest on any debt obligation of a non-Federal borrower to a non-Federal lender, but does not include the insurance of deposits, shares, or other withdrawable accounts in financial institutions”).

63. RED BOOK, *supra* note 23, at 11-4; *see* Herrick, *supra* note 25, at 79-84.

64. *See* Title XVII of the Energy Policy Act of 2005, Pub. L. No. 109-58, §§ 1701-04, 119 Stat. 1117-1122 (codified at 42 U.S.C. 16511-614). Energy Secretary Chu, in announcing the selection of the Executive Director of the DOE’s Loan Guarantee Program in 2009, stated: “The loan [guarantee] programs at DOE play a critical role in spurring investment in a clean energy economy, creating new jobs, and fighting carbon pollution.” Press Release, Dep’t of Energy, DOE Announces New Executive Director of Loan Guarantee Program (Nov. 10, 2009), *available at* <http://www.energy.gov/news/8280.htm>.

Specific federal loan guarantee programs in the clean energy space are discussed later in this article.

The authority to guarantee the repayment of indebtedness must have some statutory basis. In most cases, the basis takes the form of express statutory authorization. In the typical federal loan guarantee program, the borrower is charged a fee by the agency, prescribed in the program legislation. A guarantee may cover the entire amount of the underlying loan or a lesser percentage depending on the program legislation. Unless otherwise provided, a guarantee that extends to 100% of the underlying loan serves to restrict the amount the administering agency can guarantee.⁶⁵ Typically, the statute will authorize the administering agency to establish the terms and conditions under which the guarantee will be extended, but it may also impose various limitations and conditions.⁶⁶

When a federal agency guarantees a loan, there is no immediate cash outlay. The need for an actual cash disbursement, apart from administrative expenses, does not arise until the borrower defaults on the loan and the government is called upon to honor the guarantee. Depending on the terms of the loan, a default may not occur until many years after the guarantee is made. Accordingly, loan guarantees require budgetary treatment different from ordinary government obligations and expenditures. This treatment is prescribed generally by the Federal Credit Reform Act of 1990 (FCRA).⁶⁷ The approach of the FCRA is to require federal appropriations (or other outlay) to cover the subsidy portion of a loan guarantee program, with the nonsubsidized portion (i.e., the portion expected to be repaid) financed through borrowings from the Department of the Treasury.⁶⁸ This subsidy reflects the potential borrower default contingency of the loans that the guarantees support. The credit subsidy cost plays a large role in the DOE loan guarantee transactions, as discussed in more detail below.⁶⁹

65. RED BOOK, *supra* note 23, at 11-7.

66. *Id.*, at 11-26.

67. Omnibus Budget Reconciliation Act of 1990, Pub. L. No. 101-508, § 13201(a), 104 Stat. 1388, 1388-610 (1990) (codified as amended at 2 U.S.C. §§ 661–661f).

68. *See* 2 U.S.C. § 661c(b). More specifically, “[t]he cost of a loan guarantee [(the “credit subsidy cost”)] is] the net present value, at the time when the guaranteed loan is disbursed, of the following estimated cash flows:

- (i) payments by the Government to cover defaults and delinquencies, interest subsidies, or other payments; and
- (ii) payments to the Government including origination and other fees, penalties and recoveries; including the effects of changes in loan terms resulting from the exercise by the guaranteed lender of an option included in the loan guarantee contract, or by the borrower of an option included in the guaranteed loan contract.

Id. § 661a(5)(C).

69. *See infra* Part III.B.

6. *Rights to Intellectual Property Under Federal Incentive Programs*

The various parties' rights to intellectual property and data under grants and cooperative agreements are based primarily on two federal statutes: the Bayh-Dole Act⁷⁰ and the Energy Policy Act of 1992.⁷¹ As a general matter, under the Bayh-Dole Act, the rights to intellectual property under a financial assistance agreement depend on the corporate nature of the entity that receives the federal funds.⁷² Regarding patent rights, if the recipient (or sub-recipient) is a small business, university, or a not-for-profit corporation, title to subject inventions⁷³ under the federally funded effort becomes property of the recipient.⁷⁴ If the recipient (or sub-recipient) is a large, for-profit corporate entity, title to inventions remains with the government, subject to a request by the recipient to the government to waive the government's title to the invention.⁷⁵ The government almost always waives its title in favor of the private sector participants of these energy commercialization efforts. In both instances, the government retains a nonexclusive, nontransferable, royalty-free, limited-use license to use the invention for government-related purposes only.⁷⁶ The government will also retain a march-in right, i.e., authority to come in and license the invention to others if the invention is not commercialized.⁷⁷ In addition, the recipient must agree to negotiate with the government a United States preference clause encouraging a preference in the licensing and manufacturing of subject inventions.⁷⁸

70. Bayh-Dole Act, Pub. L. No. 96-517, §§ 301-07, 94 Stat. 3015, 3015-17 (1980) (codified in scattered sections of 35 U.S.C.). 37 C.F.R. part 401 provides guidance to federal agencies on the implementation of the Bayh-Dole Act. Part 27 of the FAR, Patents, Data and Copyrights, incorporates Bayh-Dole requirements, when applicable, into federal procurement contracts, and 10 C.F.R. section 600.325 incorporates the Act into DOE financial assistance agreements and adopts the FAR provisions when applicable.

71. Energy Policy Act of 1992, Pub. L. No. 102-486, § 3001, 106 Stat. 2776, 3126-27 (1992) (codified at 42 U.S.C. § 13541).

72. See 10 C.F.R. § 600.325 (2011) (setting out the federal intellectual property clauses for DOE financial assistance agreements).

73. "Subject invention" means any invention of the Recipient [or sub-recipients] conceived or first actually reduced to practice in the performance of work under this award." Patent and Data Provisions, 10 C.F.R. pt. 600, subpt. D, app. A, § 1(a).

74. 10 C.F.R. § 600.325(b).

75. *Id.* § 600.325(c).

76. 10 C.F.R. pt. 600, subpt. D, app. A, § 1(b).

77. *Id.* § 1(j).

78. *Id.* § 1(i). A recipient is free to negotiate with the government a satisfactory United States preference clause that would give a recipient the ability to grant the exclusive right to use or sell the invention to a party who agrees to substantially manufacture the subject invention in the United States. The extent of the preference clause depends on:

The government will not claim any rights to the recipient's proprietary intellectual property that are brought into the government-funded effort.⁷⁹ All technical data first produced under the federally funded effort will normally be unrestricted data and available for disclosure. However, the Energy Policy Act of 1992 provides recipients and sub-recipients of clean energy projects with a five-year protection from government disclosure of data first produced under the effort from the date of development of the data.⁸⁰ This protection is what most commercial recipients need to avail themselves of.

B. INCENTIVE PROGRAMS FOR THE DEVELOPMENT AND COMMERCIALIZATION OF RENEWABLE ENERGY TECHNOLOGIES

1. *Technology-Specific DOE Incentive Programs*

a. DOE's Office of Energy Efficiency and Renewable Energy

DOE's Office of Energy Efficiency and Renewable Energy (EERE) manages numerous technology-specific program areas to work cooperatively with industry and academia to develop and commercialize renewable energy electrical generation.⁸¹ Most of EERE's activity centers on funding the research, development, and commercialization of clean energy technology. The main instrument in providing funding to non-

the nature of the recipient (or sub-recipient). Generally, the DOE requires (1) universities and nonprofits limit their grant of exclusive licenses to a party that agrees to substantially manufacture in the United States; (2) small businesses agree to substantially manufacture in the United States for those products derived from the subject invention that will be sold or used in the United States; and (3) large businesses will substantially manufacture any products from the subject invention that are used or sold in any country. The clause may be negotiable, with the federal government taking into account economic reality and the benefits of worldwide use of environmental technology.

Presentation of Dr. Arun Majumdar, ARPA-E Dir, Overview of the ARPA-E Award Contracting Process for Selectees (Oct. 4, 2011).

79. Background intellectual property of the recipient that was funded exclusively at private expense is defined as "limited rights data," which, if provided to the government under the assistance agreement, will be protected from disclosure. 10 C.F.R. § 600.325(c)(3); see FAR § 27.404-2 (2010). If this data is considered trade secrets of the recipient, any disclosure by the federal agency will be treated as a violation of the Trade Secrets Act, 18 U.S.C. § 1905, with associated administrative and criminal sanctions to the individual employees who disclosed such information.

80. 42 U.S.C. § 13541(d) (2006) (applying 15 U.S.C. § 3710a(c)(7)). This data is defined as "protected data" under the financial assistance agreement. In most cases, university and nonprofit organizations will be expected by the government not to avail themselves of this protection.

81. U.S. DEP'T OF ENERGY, FISCAL YEAR 2010 BUDGET-IN-BRIEF 3 (2010), *available at* http://www1.eere.energy.gov/ba/pba/pdfs/fy10_budget_brief.pdf [hereinafter 2010 BUDGET-IN-BRIEF].

federal sources in EERE programs is federal financial assistance agreements awarded under competitive merit review processes. This section outlines the most important EERE programs, emphasizing each program's purpose and the budget amounts as appropriated by Congress. The American Recovery and Reinvestment Act (Recovery Act or Stimulus) included approximately \$16.8 billion for EERE programs, a ten-fold increase in its previous budget.⁸² EERE was appropriated a total of \$2.243 billion for fiscal year 2010.⁸³

EERE's policy is to solicit discretionary financial assistance applications in a manner that provides the maximum amount of competition feasible through a merit-based selection process.⁸⁴ All of EERE's major program areas, as discussed in more detail below, issue numerous program solicitations throughout the year — referred to as “funding opportunity announcements”,⁸⁵ inviting entities to submit applications for financial assistance in specific technology areas that advance each program's mission. These announcements are placed in the Federal Business Opportunities⁸⁶ and Grants.gov⁸⁷ websites. The electronic portal for the submission of applications to EERE in response to these announcements is FedConnect.⁸⁸

82. Pub. L. No. 111-5, 123 Stat. 114, 138 (2009).

83. H.R. REP. NO. 111-278, at 17 (2009). The White House's proposed 2011 budget increases EERE funding to \$2.3 billion. See OFFICE OF MGMT. & BUDGET, APPENDIX BUDGET OF THE U.S. GOVERNMENT FISCAL YEAR 2011 425 (2010), available at <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2011/assets/appendix.pdf> [hereinafter 2011 PROPOSAL].

84. U.S. DEP'T OF ENERGY, FEDERAL FINANCIAL ASSISTANCE OPPORTUNITIES 3 (2003), available at <http://energy.gov/sites/prod/files/maprod/documents/4ffinassthowto5.pdf>.

Merit review means a thorough, consistent, and independent examination of applications based on pre-established criteria by persons who are independent of those individuals submitting the application and who are knowledgeable in the field of endeavor for which assistance is requested. . . . Merit review is often used in conjunction with program policy evaluation factors to provide a sound basis for selection decisions. Examples of program policy factors are: geographic distribution of awards; diversity in type and size of recipients; diversity of methods, approaches, or kinds of work; and selection of projects which are complementary to other DOE programs or projects.

Id. at 3-4.

85. U.S. DEP'T OF ENERGY, GUIDE TO FINANCIAL ASSISTANCE: A GUIDE TO AWARDS AND ADMINISTRATION OF FINANCIAL ASSISTANCE 19-20 (2008), available at <http://energy.gov/sites/prod/files/GuidetoFinancialAssistance.pdf>.

86. FEDBIZOPPS.GOV, <https://www.fbo.gov/> (last visited Mar. 3, 2012).

87. GRANTS.GOV, <http://www.grants.gov/> (last visited Mar. 3, 2012).

88. FEDCONNECT, <https://www.fedconnect.net/FedConnect/> (last visited Mar. 3, 2012).

b. Solar Power Technologies

The mission of EERE's Solar Program is to "conduct research, development, demonstration, and deployment activities to accelerate widespread commercialization of clean solar energy technologies, which will lower greenhouse gas emissions, provide a clean and secure domestic source of energy, and create green jobs."⁸⁹ Within the Solar Program are four subprograms: Photovoltaic R&D,⁹⁰ Concentrating Solar Power,⁹¹ Systems Integration, and Market Transformation.⁹² Congress appropriated \$225 million to the Solar Program for 2010,⁹³ an increase of \$50 million over the 2009 appropriation.⁹⁴ The Solar Program is EERE's most funded program.

c. Wind Power Technologies

EERE's Wind Energy Program's mission is "to increase the development and deployment of reliable, affordable, and environmentally sustainable wind power, and realize the benefits of domestic renewable energy production."⁹⁵ Congress appropriated to the Wind Energy Program \$80 million for fiscal year 2010,⁹⁶ a significant increase over its 2009 appropriation of \$55 million and \$5 million more than DOE asked for.⁹⁷ The Wind Energy Program's activities are composed of two subprograms: Technology Viability⁹⁸ and Technology Application.⁹⁹

89. 2010 BUDGET-IN-BRIEF, *supra* note 81, at 37.

90. Photovoltaics R&D and Concentrating Solar Power subprograms uses light sensitive cells to convert the sun's energy into electricity. *Id.*; see also *Solar Energy Technologies Program*, U.S. DEP'T OF ENERGY, http://www1.eere.energy.gov/solar/photovoltaics_program.html (last updated Apr. 22, 2011).

91. Concentrated solar technology uses mirrors to focus the sun's energy, creating thermal energy that can be converted into electricity. 2010 BUDGET-IN-BRIEF, *supra* note 81, at 37.

92. *Id.*

93. H.R. REP. NO. 111-278, at 103 (2009).

94. See 2010 BUDGET-IN-BRIEF, *supra* note 81, at 37. The White House proposed \$302 million for 2011. 2011 PROPOSAL, *supra* note 83, at 425.

95. 3 U.S. DEP'T OF ENERGY, FY 2011 CONGRESSIONAL BUDGET REQUEST 181 (2010), available at <http://www.cfo.doe.gov/budget/11budget/content/volume%203.pdf> [hereinafter DOE BUDGET REQUEST].

96. H.R. REP. NO. 111-278, at 17.

97. 2010 BUDGET-IN-BRIEF, *supra* note 81, at 49. The White House proposed \$123 million for 2011. 2011 PROPOSAL, *supra* note 83, at 425.

98. The Technology Viability subprogram seeks to reduce the kilowatt per hour cost of electricity by developing new technology. 2010 BUDGET-IN-BRIEF, *supra* note 81, at 50.

99. The Technology Application subprogram focuses on institutional resistance to wind technology, utility planning, environmental mitigation, and interconnection issues. 2010 BUDGET-IN-BRIEF, *supra* note 81, at 51; DOE BUDGET REQUEST, *supra* note 95, at 202.

d. Geothermal Power Technologies

EERE's Geothermal Technology Program's mission is "to conduct research, development, and demonstration to establish Enhanced Geothermal Systems [(EGS)] as a major contributor for base load electricity generation."¹⁰⁰ Geothermal Technology received \$44 million for 2010, the same as in 2009.¹⁰¹ Enhanced Geothermal Systems are artificial reservoirs of geothermal energy created by drilling wells into hot rock and circulating a fluid to generate electricity.¹⁰² The technology allows exploitation of a geothermal resource that naturally lacks sufficient water or permeability.¹⁰³ Specific activities within the Geothermal Technology Program include basic research awards to companies and academia¹⁰⁴ and the creation of a national geothermal database to reduce exploration risk.¹⁰⁵

e. Fuel Cell Technology

EERE's Fuel Cell Technologies Program's mission is "to reduce petroleum use, greenhouse gas emissions (GHG) and criteria air pollutants, as well as to contribute to a more diverse energy supply and more efficient domestic energy use by enabling the widespread commercialization and application of hydrogen fuel cell technologies."¹⁰⁶ In 2010, EERE proposed to consolidate and rename its myriad of hydrogen activities into a single fuel cell research and development subprogram;¹⁰⁷ however, Congress retained the same funding structure, appropriating \$174 million for "Hydrogen Technology."¹⁰⁸ EERE has therefore retained the various hydrogen subprograms,¹⁰⁹ but operates them under its Fuel Cell Technologies Program.¹¹⁰

100. DOE BUDGET REQUEST, *supra* note 95, at 207.

101. H.R. REP. NO. 111-278, at 103; 2010 BUDGET-IN-BRIEF, *supra* note 81, at 31. The White House proposed \$55 million for 2011. 2011 PROPOSAL, *supra* note 83, at 425.

102. 2010 BUDGET-IN-BRIEF, *supra* note 81, at 31.

103. *Id.*

104. *Id.* at 32.

105. DOE BUDGET REQUEST, *supra* note 95, at 216.

106. *Id.* at 54.

107. *See id.*

108. H.R. REP. NO. 111-278, at 102 (2009). The White House proposed \$137 million for 2011. 2011 PROPOSAL, *supra* note 83, at 425.

109. The Hydrogen Storage subprogram focuses on consumer adoption of hydrogen technology in personal vehicles. DOE BUDGET REQUEST, *supra* note 95, at 77-78.

110. *See Fuel Cell Technologies Program*, U.S. DEP'T OF ENERGY, http://www1.eere.energy.gov/hydrogenandfuelcells/program_areas.html (last updated Sept. 8, 2009).

f. DOE's Office of Electricity Delivery and Energy Reliability Program

DOE's Office of Electricity Delivery and Energy Reliability (OE) was established by Congress "to lead national efforts to modernize the electric grid; enhance the security and reliability of the energy infrastructure; and mitigate the impact of, and facilitate recovery from disruptions to the energy supply."¹¹¹ OE's 2010 budget appropriation was nearly \$172 million;¹¹² the stimulus provided an additional \$4.5 billion for OE's activities.¹¹³ OE plans to spend the vast majority of the stimulus money to deploy "smart grid" technologies.¹¹⁴ Smart grid technologies continually monitor and report on grid conditions, enabling operators to increase grid stability and efficiency and enables consumers to better control their energy use.¹¹⁵ OE administers three programs: Research and Development;¹¹⁶ Permitting, Siting, and Analysis;¹¹⁷ and Infrastructure Security and Energy Restoration.¹¹⁸

2. *The Energy Advanced Research Projects Agency*

The Advanced Research Projects Agency–Energy, or "ARPA–E," is an agency within DOE. ARPA–E was established by the 2007 America COMPETES Act¹¹⁹ and funded by the Recovery Act, which provided \$400 million in stimulus funds.¹²⁰ The agency's purpose is to overcome long-term and high-risk technological barriers associated with developing new energy technologies.¹²¹ ARPA–E identifies and promotes nascent "transformational technologies" that have the potential to drastically alter

111. See DOE BUDGET REQUEST, *supra* note 95, at 499.

112. H.R. REP. NO. 111-278, at 17. The White House's proposed 2011 budget increased OE funding to \$185.9 million. 2011 PROPOSAL, *supra* note 83, at 424.

113. DOE BUDGET REQUEST, *supra* note 95, at 497.

114. *Id.* at 498.

115. *Id.*

116. The Research and Development Program seeks to "advance technology, in partnership with industry, government, and the public, to meet America's need for a reliable, efficient, and secure and affordable electric power grid." *Id.* at 513.

117. The mission of the Permitting, Siting, and Analysis Program (PSA) is "to modernize the electric grid; enhance security and reliability of the energy infrastructure." *Id.* at 499.

118. The Infrastructure Security and Energy Restoration Subprogram (ISER) coordinates national efforts to secure energy infrastructure against physical and cyber disruptions and quickly restore power when these disruptions occur. *Id.* at 498.

119. America COMPETES Act, Pub. L. No. 110-69, § 5012, 121 Stat. 572, 621 (2007) (codified at 42 U.S.C. § 16538 (Supp. 2009)).

120. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115, 140 (2009).

121. DOE BUDGET REQUEST, *supra* note 95, at 600.

the United States' energy infrastructure.¹²² Accordingly, ARPA-E is often compared to its counterpart in the Department of Defense, the Defense Advanced Research Projects Agency, or DARPA. The White House proposed to appropriate \$273 million for ARPA-E projects in 2011.¹²³

3. *U.S. Department of Agriculture Financial Assistance Programs for Renewable Energy Generation*

a. *USDA Rural Energy for America Program Grants*

Section 9007 of the 2008 Farm Bill expanded the Rural Energy for America Program (REAP) of the U.S. Department of Agriculture (USDA) to further “promote energy efficiency and renewable energy development for agricultural producers and rural small businesses.”¹²⁴ REAP is administered through the USDA’s Rural Business-Cooperative Service. REAP has three primary components: a grant program that covers the cost of energy audits and renewable energy development assistance; a financial assistance program for producers and small business owners, in the form of grants for the purchase of renewable energy systems and energy efficiency improvements; and a loan guarantee program for the purchase of these same types of systems.¹²⁵ REAP grants are awarded on a competitive basis and can be up to 25% of total eligible project costs.¹²⁶ Grants are limited to \$500,000 for renewable energy systems and \$250,000 for energy efficiency improvements.¹²⁷ Grant requests as low as \$2500 for renewable energy systems and \$1500 for energy efficiency improvements are also considered.¹²⁸ At least 20% of the grant funds awarded must be for grants of \$20,000 or less.¹²⁹

Applicants must have projects located in a rural area, must have a small business,¹³⁰ and must include all environmental review documents with supporting documentation in accordance with the NEPA. To be eligible for

122. *Id.* at 601.

123. 2011 PROPOSAL, *supra* note 83, at 421.

124. Pub. L. No. 110-234, § 9007, 122 Stat. 923, 1315-18 (2008) (codified at 7 U.S.C. § 8107); *see also* 7 C.F.R. pt. 4280, subpt. B (2011) (providing program regulations).

125. 7 U.S.C. § 8107(c). For program specifics, see *Rural Energy for America Program Grants/Energy Audit and Renewable Energy Development Assist (REAP/EA/REDA)*, USDA RURAL DEV., <http://www.rurdev.usda.gov/rbs/busp/REAPEA.htm> (last visited Mar. 3, 2012).

126. 7 C.F.R. § 4280.115(a) (2012).

127. *Id.* § 4280.115(e)-(f).

128. *Id.*

129. 75 Fed. Reg. 21,584, 21,587 (Apr. 26, 2010).

130. 7 C.F.R. § 4280.103. A rural area is defined as any area other than a city or town of 50,000 or more and the surrounding urbanized area. *Id.* The REAP small business standard adopts the North American Industry Classification System set forth in the Small Business Administration’s regulations at 13 C.F.R. pt. 121. *Id.* § 4280.108(f).

funding, a proposed renewable energy system project must meet each of the following criteria:

- (1) the project must be for the purchase of a renewable energy system;
- (2) it must be for a pre-commercial or commercially available and replicable technology;
- (3) it must have technical merit, as determined by the agency upon review;
- (4) it must be located in a rural area;
- (5) the applicant must be the owner and have financial and physical control of the project;
- (6) the site must be under the applicant's control during the term of financing; and
- (7) there must be satisfactory sources of revenue to operate, maintain, and service debt over the life of the project.¹³¹

Adverse decisions on awards of REAP grants are appealable to USDA's National Appeals Division.¹³²

b. USDA Repowering Assistance Program

Authorized under Title IX of the 2008 Farm Bill,¹³³ the Repowering Assistance Program encourages the use of biomass as a replacement fuel source for fossil fuel to power and heat biorefineries by providing payments to existing biorefineries to replace the use of fossil fuels in the facility as a power source.¹³⁴ The Repowering Assistance Program is also administered by the USDA's Rural Business-Cooperative Service but in conjunction with the Rural Utilities Service. The eligibility provisions of the statute simply require the applicant demonstrate, by means of an independent study, that the renewable biomass system of the eligible biorefinery is feasible, taking into account the economic, technical, and environmental aspects of the system.¹³⁵ As of February 2011, there is no requirement that the biorefinery be located in a rural area or that an applicant needs to be a citizen to be eligible for repowering assistance.¹³⁶ A key threshold eligibility factor is the facility be

131. 7 C.F.R. § 4280.115(e)-(f).

132. *Id.* § 4280.105.

133. Repowering Assistance, Pub. L. No. 110-234, § 9004, 122 Stat. 923, 1313-14 (2008) (codified at 7 U.S.C. § 8104 (Supp. 2010)); *see also* 7 C.F.R. pt. 4288 (providing program specifics).

134. 7 U.S.C. § 8104 (Supp. 2010). The program awarded approximately \$20 million in funds in FY 2009 and \$40 million in FY 2010. Notice of Contract Proposal (NOCP) for Payments to Eligible Advanced Biofuel Producers, 74 Fed. Reg. 28,009, 28,012 (June 12, 2009); Notice of Contract Proposal (NOCP) for Payments to Eligible Advanced Biofuel Producers, 75 Fed. Reg. 24,781, 24,865 (May 6, 2010). In March 2011, \$25 million was made available to this program for financial assistance. Notice of Contract Proposal (NOCP) for Payments to Eligible Advanced Biofuel Producers, 76 Fed. Reg. 13,345, 13,349 (Mar. 11, 2011).

135. 7 U.S.C. § 8104 (c) (Supp. 2010).

136. *See* Repowering Assistance Payments to Eligible Biorefineries, 76 Fed. Reg. 7916 (Feb. 11, 2011).

an “eligible biorefinery” in existence as of the date of enactment of the 2008 Farm Bill.¹³⁷

4. *Bureau of Land Management Incentives for Renewable Generation*

A major source of delay for renewable energy and transmission line projects on federal lands is permitting and environmental review. The U.S. Department of Interior’s Bureau of Land Management (BLM) is the primary federal landholder for property favorable for energy development.¹³⁸ As of April 2011, BLM had 241 wind projects and 199 applications for solar projects by the private sector on BLM lands in various stages of processing.¹³⁹ Recognizing this bottleneck, BLM allocated \$41 million of Recovery Act funds to speed the permitting and environmental review processes for sixty-five renewable energy and transmission projects on public land.¹⁴⁰ In February 2011, Secretary of the Interior, Ken Salazar, implemented a coordinated approach between BLM and the Fish and Wildlife Service (FWS) to fast track renewable energy projects on public lands by improving the siting and permitting process.¹⁴¹ Two FWS documents were issued that were designed to provide agency employees, developers, and state organizations with the information they need to make the best possible decisions in reviewing and selecting sites for utility-scale and community-scale wind energy facilities in order to avoid and minimize

137. The term “biorefinery” means a facility (including equipment and processes) that (1) converts renewable biomass into biofuels and biobased products; and (2) may produce electricity. 7 U.S.C. § 8101(7). Biorefinery is further defined as a “producer, whose primary production is liquid transportation biofuels, that meets all requirements of this program. The biorefinery must have been in existence on or before June 18, 2008.” Notice of Funding Availability (NOFA) for Repowering Assistance Payments to Eligible Biorefineries, 74 Fed. Reg. 28,009, 28,011 (June 12, 2009).

138. BLM’s website describes the wind, solar, geothermal, biomass resources and transmission corridors under BLM’s control. See *Renewable Energy Resources*, BUREAU OF LAND MGMT., http://www.blm.gov/wo/st/en/prog/energy/renewable_energy.html (last visited Feb. 27, 2012).

139. Press Release, Bureau of Land Mgmt., Secretary Salazar, Senator Reid Announce “Fast-Track” Initiatives for Solar Energy Development on Western Lands (June 29, 2009), available at http://www.blm.gov/wo/st/en/info/newsroom/2009/june/NR_0629_2009.html.

140. See *Bureau of Land Mgmt. – Renewable Energy Authorization*, DEP’T OF INTERIOR RECOVERY INV., <http://recovery.doi.gov/press/bureaus/bureau-of-land-management/bureau-of-land-management-renewable-energy-authorization/> (last visited Feb. 2, 2012).

141. *Salazar Announces Additional Steps Toward Smarter Development of Renewable Energy on U.S. Public Lands*, U.S. DEP’T OF INTERIOR (Feb. 8, 2011), <http://www.doi.gov/news/pressreleases/Salazar-Announces-Additional-Steps-toward-Smarter-Development-of-Renewable-Energy-on-US-Public-Lands.cfm>.

negative impacts to fish, wildlife, plants, and their habitats.¹⁴² In conjunction, BLM issued its final policy memoranda to provide guidance to field managers in evaluating, screening, and processing applications for utility-scale wind and solar energy projects on BLM-managed lands. This field guidance clarifies and improves NEPA documentation, streamlines the project application review and approval process, and strengthens development plans and due diligence requirements.¹⁴³

To help focus BLM's resources on the processing of wind, solar, geothermal energy applications, and permitting of electrical transmission facilities on public lands, the Department of Interior has established a network of Renewable Energy Coordination Offices,¹⁴⁴ which include multidisciplinary BLM staff and resources from other federal and state agencies to assist in the processing of applications. BLM has also identified nearly twenty-three million acres of public land with solar energy potential in six southwestern states and more than twenty million acres of public land with wind energy potential in eleven western states.¹⁴⁵ It has completed programmatic environmental impact studies (PEIS) for wind and geothermal development and is working on a PEIS for solar development. The Solar PEIS has preliminarily identified twenty-four Solar Energy Study Areas on BLM-administered land located in six western states.¹⁴⁶

142. Fisheries and Habitat Conservation and Migratory Birds Program; Draft Land-Based Wind Energy Guidelines, 76 Fed. Reg. 9590 (Feb. 18, 2011); Migratory Birds; Draft Eagle Conservation Plan Guidance, 76 Fed. Reg. 9529 (Feb. 18, 2011).

143. The BLM policy is set forth in three Instruction Memoranda dated February 7, 2011. Memorandum from Dir. of Bureau of Land Mgmt. to All Field Offices, National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations (Feb. 7, 2011), <http://blm.gov/y15c>; Memorandum from Dir. of Bureau of Land Mgmt. to All Field Offices, Solar and Wind Energy Applications – Due Diligence (Feb. 7, 2011), *available at* <http://blm.gov/z15c>; Memorandum from Dir. of Bureau of Land Mgmt. to All Field Offices, Solar and Wind Energy Applications – Pre-Application Screening (Feb. 7, 2011), *available at* <http://blm.gov/x15c>.

144. As of 2010, BLM has established Renewable Energy Coordination Offices in California, Nevada, Arizona, and Wyoming, where the majority of the existing workload for renewable energy applications and projects is currently located. *See Secretary Salazar, Director Abbey Open Renewable Energy Coordination Office in California to Speed Project Processing*, U.S. DEP'T OF INTERIOR (Oct. 9, 2009), http://www.doi.gov/news/pressreleases/2009_10_09_releaseC.cfm.

145. *See* U.S. Dep't of the Interior, *New Energy for America*, BUREAU OF LAND MGMT., http://www.blm.gov/wo/st/en/prog/energy/renewable_energy.html (last visited Aug. 25, 2012).

146. *See Solar Energy Development Programmatic EIS Info. Center*, SOLAREIS, <http://solareis.anl.gov/> (last visited Feb. 27, 2012) (providing information about the ongoing Solar PEIS process).

C. FEDERAL INCENTIVE PROGRAMS FOR THE DEVELOPMENT AND
COMMERCIALIZATION OF RENEWABLE TRANSPORTATION FUELS

1. *DOE Office of Biomass*

The DOE's Biomass Program Office in EERE works with industry, academia, and the DOE's national laboratory partners on research in biomass feedstocks and conversion technologies.¹⁴⁷ Its research, development, and demonstration efforts are geared toward the development of integrated biorefineries into cost-competitive, high-performance biofuels, bioproducts, and biopower.¹⁴⁸ The Biomass Program is focusing its research and development efforts to ensure that cellulosic ethanol is cost competitive by 2012.¹⁴⁹ Another major effort of the program is to further develop infrastructure and opportunities for market penetration of bio-based fuels and products.¹⁵⁰ The program's technology pathways with industry under financial assistance agreements target the following areas: feedstocks barriers for biofuels development; biochemical conversion technologies; thermochemical conversion technologies; integrated biorefineries; and large-scale biopower.¹⁵¹

2. *DOE/USDA Biomass Research and Development Initiative*

Reauthorized under section 9008 of the 2008 Farm Bill,¹⁵² the Biomass Research and Development Initiative extended the program originally created under the Biomass Research and Development Act of 2000 and amended by the Energy Policy Act of 2005. The initiative is a joint DOE/USDA program that provides competitive grants, contracts, and financial assistance to eligible entities to carry out research, development, and demonstration of biofuels and bio-based products, as well as the methods, practices, and technologies for their production.¹⁵³ The USDA's Cooperative State Research, Education, and Extension Service and the DOE Office of Biomass Programs competitively award grants to eligible entities to research, develop, and

147. See DOE BUDGET REQUEST, *supra* note 95, at 97. The DOE Biomass Program was appropriated \$214 million in funds for R&D activities in fiscal year 2009, but an additional \$777 million was funds derived from the Recovery Act. *Id.* at 97. Its 2010 funding is \$220 million, and it has requested \$220 million for fiscal year 2011. *Id.*

148. See *id.* at 98-99.

149. See *id.* at 104-05.

150. See *id.* at 99.

151. *Id.* at 105.

152. Food, Conservation, and Energy Act of 2008 (Biomass Research and Development Initiative), Pub. L. No. 110-234, § 9008(e), 122 Stat. 923, 1320-24 (2008) (codified at 7 U.S.C. § 8108(e) (Supp. 2009)).

153. *Id.* § 8108(e).

demonstrate biomass projects. As amended by the 2008 Farm Bill, the three main technical areas are: (1) feedstocks development, (2) biofuels & bio-based products development, and (3) biofuels development analysis.¹⁵⁴ The program offers an annual funding opportunity announcement that is jointly managed, but lead administration rotates between the two agencies every other year. All eligible applications are evaluated in a joint USDA/DOE technical merit review process.¹⁵⁵

3. *USDA Bioenergy Program for Advanced Biofuels*

The USDA's Bioenergy Program for Advanced Biofuels, as managed by the Rural Business-Cooperative Service, provides payments to eligible advanced biofuel producers in rural areas to support and ensure an expanding production of advanced biofuels.¹⁵⁶ The program authorizes USDA to enter into contracts with producers for payments based on the amount of biofuels produced from renewable biomass other than corn kernel starch.¹⁵⁷ Eligible examples include biofuels derived from cellulose; crop residue; animal, food and yard waste material; biogas (landfill and sewage waste treatment gas); vegetable oil and animal fat; and butanol.¹⁵⁸ The producer payments are intended to help eligible producers support and ensure an expanded production of advanced biofuels as necessary steps toward meeting the nation's energy needs. The amount of each payment will depend on the number of eligible advanced biofuel producers participating in the program, the amount of advanced biofuels being produced by the advanced biofuel producer, and the amount of funds available during a given yearly funding cycle.¹⁵⁹ As of February 2011, eligible producers did not need to be located in a rural area and could be

154. *Id.* § 8108(e)(3).

155. *Id.* § 8108(e)(1). Applicants must clearly demonstrate the value chain element they intend to focus on and specify whether the project is conducting research or a demonstration. The value chain can be characterized as consisting of the following elements: feedstock development and growth; feedstock harvesting and preparation; feedstock logistics and transportation; feedstock storage and handling; biomass preprocessing (as appropriate); biomass conversion; production of biofuels/bioenergy/bio-based products; product logistics and handling; and product delivery and distribution. See DOE Funding Opportunity Announcement, DE-FOA-0000657 at 9-11 (Mar. 22, 2012).

156. Food, Conservation, and Energy Act of 2008, Pub. L. No. 110-234, § 9005, 122 Stat. 923, 1314 (2008) (codified at 7 U.S.C. § 8105).

157. 7 C.F.R. § 4288.102 (2012). For the program rules, see 7 C.F.R. pt. 4288 subpt. B. For the Bioenergy Program for Advanced Biofuels guidelines, see 7 C.F.R. pt. 4288 subpt. A. Additional proposal and funding information is provided in periodic Notice of Proposals. See, e.g., Notice of Contract Proposal (NOCP) for Payments to Eligible Advanced Biofuel Producers, 76 Fed. Reg. 13,345 (Mar. 11, 2011).

158. 7 C.F.R. § 4288.2.102 (2012).

159. The program received \$80 million in FY 2010, \$85 million in FY 2011, and is expected to receive \$105 million in FY 2012. 7 U.S.C. § 8105; see also 7 U.S.C. § 8105(g).

foreign-owned.¹⁶⁰ Decisions concerning project funding are subject to USDA's appeal process.¹⁶¹

D. ENERGY EFFICIENCY FINANCIAL INCENTIVE PROGRAMS

1. *DOE's State Energy Program*

The State Energy Program (SEP), also administered out of the Weatherization and Intergovernmental Activities Program Office of EERE,¹⁶² is intended to help states reduce energy use and cost, increase renewable energy capacity and production, and lessen dependence on foreign oil. The program provides technical and financial resources to help states develop and manage a variety of high-impact energy programs.¹⁶³ Financial assistance is provided through formula grants and competitive clean energy project grants.¹⁶⁴ States often combine many sources of funding for their projects, including through the DOE and private industry. These formula grants from the DOE allow state energy offices the flexibility to develop energy projects focused on the building, electric power, industry, and/or transportation sectors, as well as cross-cutting policy initiatives and public information campaigns. SEP special competitive grants¹⁶⁵ allow the DOE to target high-impact projects geared toward critical policy and regulatory changes, including the adoption of advanced building codes, prioritization of energy efficiency in resource planning, and decoupling of utility earnings from volumetric energy sales.¹⁶⁶ A portion of program funding is used for (1) outreach and technical assistance to states, such as development of state and regional best practices; (2) innovative sustainable energy initiatives; and (3) performance management.¹⁶⁷

160. *See* 7 C.F.R. § 4288.110.

161. *Id.* § 4288.3.

162. The SEP was authorized by the Energy Policy and Conservation Act, 42 U.S.C. § 7101 and operates under regulation found at 10 C.F.R. pt. 420 (2012).

163. SEP formula grants totaled \$25 million in 2010 and the same amount will be allotted in 2011. *See* DOE BUDGET REQUEST, *supra* note 95, at 442.

164. 10 C.F.R. Part 420 (2012).

165. SEP competitive grants to states totaled \$25 million in FY 2010, and \$37.5 million is planned for FY 2011. The most recent solicitation cycle (FY 2008) resulted in the award of \$6.6 million in competitive grants for fifteen state-level projects, nine of which focused on developing policy and regulations to support gigawatt-scale clean energy capacity, and six of which focused on developing advanced building codes. Future areas of interest include encouraging (1) states and utilities to improve energy efficiency and renewable energy deployment; and (2) optimization of state energy planning and protocols. DOE BUDGET REQUEST, *supra* note 95, at 442.

166. *Id.*

167. *Id.*

2. *DOE's Energy Efficiency and Conservation Block Grant Program*

The Energy Efficiency and Conservation Block Grant (EECBG) Program¹⁶⁸ provides funds to states, United States territories, counties, cities, and Indian tribes to reduce their energy use and fossil fuel emissions and improve energy efficiency in the transportation, buildings, and other appropriate sectors. The Recovery Act appropriated \$3.2 billion for the EECBG program, with \$400 million to be awarded on a competitive basis to entities that are eligible to receive formula-based funds.¹⁶⁹ In addition, section 546 of the Energy Independence and Security Act (EISA) stipulates that 2% of total program funding is reserved for competitive awards to units of local government (including Indian tribes) that are ineligible to receive formula-based funds, and to consortia of the ineligible entities.¹⁷⁰

DOE anticipates that a total of up to \$453.72 million will be available for competitive grants awarded through one Funding Opportunity Announcement (FOA) with two topic areas.¹⁷¹ The eligible entities for up to \$390.04 million available under Topic 1 are the same as for the formula EECBG program: states, United States territories, counties, cities, and Indian tribes.¹⁷² The eligible entities for up to \$63.68 million available under Topic 2 are units of local government and Indian tribes that are not eligible for the direct formula grants.¹⁷³ The goal of the competitive FOA is to stimulate activities that move beyond traditional public awareness campaigns, program maintenance, demonstration projects, and other “one-time” strategies and projects. The DOE seeks to stimulate activities and investments that: (1) fundamentally and permanently transform energy

168. The current EECBG was authorized in Title V, Subtitle E of the Energy Independence and Security Act of 2007. Pub. L. No. 110-140, §§ 541-48, 121 Stat. 1492, 1667-74 (2007) (codified at 42 U.S.C. §§ 17151-58 (Supp. 2009)).

169. H. REP. NO. 111-16, at 427 (2009) (Conf. Rep.).

170. Pub. L. No. 110-140, § 546, 121 Stat. 1492, 1673 (2007) (codified at 42 U.S.C. § 17156).

171. *Financial Assistance Funding Opportunity Announcement*, U.S. DEP'T OF ENERGY, 7 (Oct. 19, 2009), available at http://www1.eere.energy.gov/wip/pdfs/eeccb_g_competitive_foa148_amendment3.pdf.

Topic 1, the Retrofit Ramp-up Program, provides up to \$390.04 million for programs of \$5 to \$75 million for [eight] to [twenty] awards. Topic 2, The General Innovation Fund, is for competitive grants that are reserved for units of local government and state-recognized tribes not eligible for direct formula grants, as per EISA 2007 requirements. Topic 2 provides up to \$63.68 million (approximately 2[%] of \$3.2 billion) for projects of \$1 to \$5 million for [fifteen] to [sixty] awards.

Id.

172. *Id.*

173. *Id.*

markets in a way that makes energy efficiency and renewable energy the options of first choice; and (2) sustain themselves beyond the grant monies and the grant period by designing a viable strategy for program sustainability into the overall program plan.¹⁷⁴

3. *Energy Efficiency Programs for American Energy-Intensive Industries*

Energy-intensive industries are severely constrained in their ability to invest in research and development (R&D) due to their low profit margins and inability to fully appropriate R&D benefits to their companies. Process technologies that use less energy per unit of output are logical investment opportunities for energy-intensive industries, but energy-intensive manufacturers are often unable to invest in energy-related process R&D without government assistance. The DOE's Industrial Technologies Program Office (ITP) in EERE supports cost-shared R&D, through financial assistance agreements with industry partners, to address energy challenges that industries face, while fostering the adoption of advanced technologies and best energy management practices.¹⁷⁵ To achieve its goals, ITP supports R&D on efficient new technologies; promotes distributed generation and fuel and feedstock flexibility; supports the commercialization of emerging technologies; assists industrial facilities to access and use proven technologies, energy assessments, software tools, and other resources; and promotes a culture of energy efficiency and carbon management in industry.¹⁷⁶ Current funding for partnerships with industry is \$96 million.¹⁷⁷ ITP received \$350 million in FY 2009 with the addition of Recovery Act funds.¹⁷⁸

4. *DOE's Building Efficiency Technology Program*

Buildings account for more than 70% of the electric energy consumed in the United States and 38% of total United States carbon dioxide

174. *Id.*

175. DOE BUDGET REQUEST, *supra* note 95, at 347-348. ITP partnerships with key high-energy use industry groups and companies support the goal of section 106 of the Energy Policy Act of 2005 of achieving a 25% reduction in United States industrial energy intensity by 2017.

176. *Id.* at 342-44, 347-48. Recovery Act funding within ITP has helped to stimulate the economy and create and retain jobs through Combined Heat and Power, District Energy Systems, Waste Heat Recovery, Efficient Industrial Equipment, Information Technology Equipment Efficiency, and Pre-commercial Technology Demonstration for Information and Communication Technology Systems projects.

177. *Id.* at 341.

178. ITP's budget request for 2011 is for \$100 million. *Id.*

emissions.¹⁷⁹ The purpose of the DOE's Office of Building Technology, also within EERE, is to foster development of energy-efficient technologies in the American building and residential sectors¹⁸⁰ The program achieves its goal through partnering with non-federal entities to develop promising R&D of energy-efficient technologies; equipment standards and analysis; and technology validation and market introduction assistance.¹⁸¹ R&D activities research the most advanced energy efficiency technologies. For instance, equipment standards and analysis activities eliminate the most inefficient existing technologies in the market by establishing new, and improving existing, energy efficiency standards based on technology and product advances that frequently include technology R&D.¹⁸² Also, validation activities catalyze the introduction of new advanced technologies, and the widespread use of highly efficient technologies already in the market frequently include technology R&D. Funding levels for this program as of 2011 are \$222 million.¹⁸³

5. *Federal Energy Savings Performance Contracting*

As the largest consumer of energy in the United States, the federal government is required by Congress to reduce federal energy consumption costs.¹⁸⁴ One of the major tools at the federal government's disposal is the energy savings performance contract (ESPC).¹⁸⁵ These long-term federal procurement contracts, first authorized by Congress in 1985,¹⁸⁶ have begun to be used more often by the federal government to institute energy conservation measures at federal installations.¹⁸⁷ The ESPC allows federal

179. *2009 Buildings Energy Data Book*, U.S. DEP'T OF ENERGY, 1-1, 1-20 (Oct. 2009), available at http://buildingsdatabook.eren.doe.gov/docs%5CDataBooks%5C2009_BEDB_Updated.pdf.

180. DOE BUDGET REQUEST, *supra* note 95, at 295.

181. *Id.* at 301.

182. *Id.* at 308-10.

183. *Id.*

184. *See generally* National Energy Conservation Policy Act of 1978, Pub. L. No. 95-619, 92 Stat. 3206 (1992).

185. *See* 10 C.F.R. § 436.34 (2009).

186. Title VIII of the National Energy Conservation Policy Act, was amended several times. Energy Independence and Security Act of 2007, Pub. L. 110-140, §§ 511-18, 121 Stat. 1482, 1658-61; Energy Policy Act of 1992, Pub. L. No. 102-486, § 155, 106 Stat. 2776, 2852-55 (1992); Consolidated Omnibus Budget Reconciliation Act of 1985, Pub. L. No. 99-272, § 7201, 100 Stat. 82, 142-43 (1986) (codified at 42 U.S.C. §§ 8260, 8287 (2006)). *See generally* Herrick, *supra* note 25, at 96-98 (discussing ESPCs).

187. *See* U.S. DEP'T OF ENERGY, FEDERAL ENERGY MANAGEMENT PROGRAM 1 (2011), available at http://www1.eere.energy.gov/femp/pdfs/espc_intro.pdf. Approximately \$3.9 billion has been invested in federal facilities through ESPCs, saving more than \$32.8 trillion BTU annually, equivalent to the energy used by a city of more than 893,000 people. *Id.* DOE estimates that energy cost savings of \$13.1 billion for the federal government (\$10.1 billion goes to finance

agencies to waive the federal standard requirements for up-front capital funding of infrastructure projects and one-year federal contract financing¹⁸⁸ and enter into contracts for up to twenty-five years with energy service companies (ESCOs)¹⁸⁹ for the purpose of saving energy-consumption costs at federal installations.¹⁹⁰ The energy savings that result from the installation and use of the equipment by the ESCO can be shared between the government and the ESCO. An ESPC is, thus, a partnership between a federal agency and an ESCO, where the ESCO conducts a comprehensive energy audit for the federal facility and identifies improvements to save energy. In consultation with the federal agency, the ESCO then designs and constructs a project, defined as an energy conservation measure, which meets the agency's needs.¹⁹¹ The critical factor in this type of contracting is that the ESCO arranges the necessary financing for the capital improvements to the agency site.¹⁹² The ESCO guarantees the improvements will generate energy cost savings sufficient to pay for the project over the term of the contract. After the contract ends, all additional cost savings accrue to the agency.¹⁹³

The trend has been to create more flexibility in ESPC contracting. ESPCs now can be used for developing renewable energy generation projects at federal sites. In 2007, Congress provided the authority to sell or transfer energy generated on federal sites from renewable energy sources or cogeneration in excess of federal needs to utilities or non-federal energy users in accordance with existing federal or state laws.¹⁹⁴ Congress also allowed the use of any combination of appropriated funds and private

project investments) are due to the implementation of ESPCs. *Id.* More than 570 ESPC projects have been awarded by twenty-five different federal agencies in forty-nine states and Washington, D.C. *Id.*

188. Herrick, *supra* note 25, at 96. An agency does not need a specific appropriation to cover capital costs associated with the contract activity, or specific statutory authority to contract beyond one year, to enter into an ESPC. As such, ESPCs are exempted from the federal Anti-Deficiency Act. *See* 31 U.S.C. § 1341 (2006).

189. ESCOs develop, install, and finance projects designed to improve energy efficiency and reduce operation and maintenance (O&M) costs for their customers' facilities. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project. Neil Peretz, *Growing the Energy Efficiency Market Through Third-Party Financing*, 30 ENERGY L.J. 377, 391-95 (2009).

190. *See, e.g.,* David Frenkil, *Energy Saving Performance Contracts: Assessing Whether to "Retrofit" an Effective Contracting Vehicle for Improving Energy Efficiency in Federal Government Facilities*, 39 PUB. CONT. L.J. 331, 333-41 (2010); Herrick, *supra* note 25, at 96.

191. *See, e.g.,* Peretz, *supra* note 189, at 391-95; Herrick, *supra* note 25, at 96-97.

192. Peretz, *supra* note 189.

193. *Id.*

194. Energy Independence and Security Act, *supra* note 168, §§ 512-13, 121 Stat. 1658 (2007).

financing in federal ESPCs.¹⁹⁵ In addition, the DOE has been active in supporting greater flexibility by encouraging the use of “Super ESPCs.”¹⁹⁶ These “umbrella” contracts allow agencies to undertake multiple energy projects under the same contract.¹⁹⁷ Using a Super ESPC, an agency can bypass cumbersome procurement procedures and partner directly with an ESCO to develop an energy efficiency or renewable energy project. As a result, Super ESPCs are being used more frequently by federal agencies, and they have largely supplanted stand-alone ESPCs.¹⁹⁸

E. FEDERAL LOAN GUARANTEE PROGRAMS FOR CLEAN ENERGY PROJECTS

1. *Title XVII Loan Guarantee Program—New and Innovative Clean Energy Technology Projects*

DOE’s clean energy loan guarantee program, authorized under Title XVII of the Energy Policy Act of 2005¹⁹⁹ and administered by the DOE’s Loan Programs Office, encourages early commercial use of new or significantly improved technologies in energy projects. Section 1703²⁰⁰ authorizes the DOE to provide loan guarantees for renewable energy generation and manufacturing systems, advanced nuclear generation facilities, coal gasification, carbon sequestration, energy efficiency, and many other types of clean energy projects that use new or significantly

195. *Id.*

196. *See, e.g.,* The National Renewable Energy Laboratory monograph *Super Energy Savings Performance Contracts*: <http://www.nrel.gov/docs/fy03osti/34312.pdf>. Under Super ESPCs, the DOE, through its Federal Energy Management Program Office, has already completed the Federal Acquisition Regulations procurement process, in compliance with all necessary requirements, and awarded contracts to selected ESCOs, who are then prequalified to undertake specific task orders. In much less time than it takes to develop a stand-alone ESPC, a federal site can implement a Super ESPC delivery order project and begin to realize energy and cost savings.

197. *Id.*

198. DOE has established two types of Super ESPs: Regional and Technology-Specific Super ESPCs. *Id.* Regional Super ESPCs allow agencies in a particular region of the United States to place delivery orders with preselected ESCOs for projects using a wide variety of proven energy efficiency and conservation measures. *Id.* Technology-Specific Super ESPCs encourage the use of emerging renewable energy systems to help federal agencies benefit from these promising technologies. *Id.* Technology-Specific Super ESPCs currently focus on three energy systems: biomass-based fuels, geothermal heat pumps, and photovoltaic systems, where the featured technology is the center of the project. *Id.*

199. Pub. L. No. 109-58, §§ 1701-04, 119 Stat. 594, 1117-22 (2005) (codified at 42 U.S.C. §§ 16511-14 (2006)); *see also* 10 C.F.R. pt. 609 (2011) (providing implementation of Title XVII of the Energy Policy Act of 2005).

200. 42 U.S.C. § 16513 (2006).

improved²⁰¹ technologies in commercial projects that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and have a reasonable prospect of repayment. The initial governmental response to the program was slow, but it now forms the cornerstone of the Obama administration's efforts to commercialize clean energy technologies.²⁰²

Under Title XVII, the face value of any debt that is supported by a DOE loan guarantee cannot be more than 80% of the total cost of the project.²⁰³ DOE will require that the project sponsor(s) provide "significant equity investment in the project."²⁰⁴ While the statute²⁰⁵ allows for either the borrower or the government, through a direct outlay of appropriations, to pay for the project's "credit subsidy cost,"²⁰⁶ the DOE has required the borrower, under the § 1703 program, to pay for that cost directly before closing.²⁰⁷ If the DOE guarantees 100% of the loan amount, that is, 80% of the total project costs — the loan must be issued by the Federal Financing Bank, a unit of the U.S. Department of Treasury.²⁰⁸ If the guarantee is less

201. "New or significantly improved technologies" means technologies that have "[o]nly recently been developed, discovered or learned; or . . . [i]nvolves or constitutes one or more meaningful and important improvements in productivity or value in comparison to Commercial Technologies in use," referring to technology used in three or more project for over five years. 10 C.F.R. § 609.2.

202. From the program's inception in 2005 until 2010, only one project had received a loan guarantee. However, the pace of the program has sped up in 2009 and into 2010. As of March 2011, eight loan guarantees have been executed and an additional four conditional commitments for loan guarantees have been approved. U.S. DEP'T OF ENERGY, FY 2011 CONGRESSIONAL BUDGET REQUEST: BUDGET HIGHLIGHTS 53-54 (2010), *available at* <http://www.cfo.doe.gov/budget/11budget/Content/FY2011Highlights.pdf>. Current support for the section 1703 program is over \$51 billion in authority to guarantee loans, and the section 1705 program has received \$4 billion in subsidy cost funding. *Id.* at 54. The 2011 DOE budget request to Congress asks for an additional \$36 billion in loan guarantee authority for nuclear projects and \$500 million for section 1703 subsidy costs, which could authorize up to \$5 billion in national new and innovative project loan guarantees. *Id.*

203. 10 C.F.R. §§ 609.10(d)(3); 609.12 (setting out what DOE will considered as eligible project costs).

204. *Id.* § 609.10(d)(5).

205. 42 U.S.C. § 16512(b).

206. *See* discussion *infra* Part III.B (explaining credit subsidy costs for federal loan guarantees).

207. 10 C.F.R. § 609.9(d)(1). The credit subsidy cost is to be paid in cash (not project equity) and cannot be rolled over into the loan as a project cost. *Id.* § 609.12(c)(8).

208. *Id.* § 609.10(d)(4)(i). The Federal Financing Bank was created by the Federal Financing Bank Act of 1973. Pub. L. No. 93-224, 87 Stat. 937 (1973) (codified at 12 U.S.C. §§ 2281-96). Its purpose is to coordinate federal credit programs with overall government economic and fiscal policies. *Id.* § 2. It has authority to purchase any obligation guaranteed by another federal agency to ensure that fully guaranteed obligations are financed efficiently. *Id.* § 6. It is a corporate instrumentality of the United States government, subject to the general direction and supervision of the Secretary of the Treasury. *Id.* § 4. The Bank essentially acts as an intermediary in a federal credit support transaction by purchasing the debt under a federal agency loan guarantee program. The Bank obtains funds by issuing its own securities, almost entirely to the Treasury. *Id.* §§ 6-9.

than 100% of the loan, an eligible lender must issue it.²⁰⁹ The guaranteed portion of the loan cannot be “stripped” from the nonguaranteed portion for subsequent syndication if the DOE guarantee is above 90%.²¹⁰ The term of the loan that is backed by a DOE guarantee is the lesser of thirty years or 90% of the projected useful life of the project.²¹¹ The DOE has the flexibility to determine on a project-by-project basis the scope of the collateral package and whether *pari passu* lending is in the best interest of the government.²¹² Furthermore, an applicant under the DOE program is required to pay substantial administrative fees prior to closing.²¹³

2. Recovery Act Loan Guarantee Program

The Recovery Act, in adding a new section 1705 to Title XVII, established a temporary loan guarantee program in the DOE’s existing Loan Program Office for the rapid deployment of commercial-ready renewable energy and electric power transmission projects, as well as cutting-edge biofuels projects.²¹⁴ This program, referred to as the section 1705 Program, increases loan guarantee funding authority, expands on the type of projects eligible for loan guarantees, and provides more flexibility to overcome barriers of the existing DOE loan guarantee program.

The Recovery Act substantially expands the categories of projects eligible for DOE loan guarantees by first opening the program up to commercial projects using existing technologies in the wind, solar, and geothermal sectors, as well as commercial projects that manufacture components related to renewable energy generation.²¹⁵ Second, the law expands eligibility to electric power transmission systems, including upgrading and re-conducting projects.²¹⁶ Third, eligibility now extends to biofuel projects that are likely candidates for full commercial use as transportation fuels.²¹⁷ However, due to internal DOE credit restraints, it is unlikely the DOE will issue loan guarantees for biorefineries. For all of these categories, the Recovery Act imposes two major conditions on all

209. *Id.* § 609.11 (discussing eligible lender qualifications).

210. *Id.* § 609.10(d)(4)(ii).

211. 42 U.S.C. § 16512(f) (2006).

212. *In pari passu* is when lenders share creditor rights proportionally with other lenders. Unlike the earlier version of the DOE’s loan guarantee regulations, the DOE now does not have to obtain the senior security interest position in project assets. *See* 10 C.F.R. § 609.10(d)(22).

213. A loan guarantee requires substantial fees, including an application fee, a facility fee, and maintenance fees. Up-front fees are due at closing. *Id.* § 609.9(d)(2).

214. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 406, 123 Stat. 115, 145 (2009) (codified at 42 U.S.C. § 16516 (Supp. 2009)).

215. 42 U.S.C. § 16516(a)(1).

216. *Id.* § 16513(a)(2).

217. *See generally id.* § 16513.

three new categories eligible for the loan guarantee program: (1) any eligible project must commence construction before September 30, 2011, and (2) such projects must comply with the Davis Bacon Act in establishing wage rate requirements for federal-like construction projects.²¹⁸ The previous program had no such limitations. Finally, the Recovery Act waives the burdensome requirement that the borrowers pay with their own funds the credit subsidy cost of their projects.²¹⁹ Of the \$6 billion originally appropriated for this purpose under the Recovery Act, Congress subsequently stripped the program of \$2 billion in 2009, and another \$1.5 billion in 2010 for use on other Recovery Act priorities.²²⁰

On October 7, 2009, the DOE announced its Financial Institution Partnership Program (FIPP) in conjunction with the issuance of its solicitation under the section 1705 Program.²²¹ Under FIPP, the developer of an eligible project is required to seek project construction loans from eligible FIPP financial institutions.²²² Those financial institutions will then apply directly to the DOE to obtain a loan guarantee and assume some portion of risk in the project.²²³ The DOE expects the lender to conduct the necessary credit approval activities incumbent to similar senior debt, limited recourse, energy project finance transactions.²²⁴ The DOE also believes FIPP will allow the quick and prudent implementation of the section 1705 Loan Guarantee Program by using the resources of existing private sector financial institutions that have experience in larger-scale energy project financings.²²⁵ Under FIPP, a DOE loan guarantee will cover only 80% of the maximum aggregate loan principal and interest during the loan term for a maximum guarantee 64% of the project.²²⁶ The other limiting factor of the FIPP Program is developers will not be able to take advantage of federal debt financing from the Federal Financing Bank (FFB). This limitation differs from the DOE's earlier solicitations for section 1703

218. *See generally id.* § 16513(c).

219. The American Recovery and Re-Investment Act, Pub. L. No 111-5, 123 Stat.114,140 (2009).

220. Pub. L. No. 111-226, § 308, 124 Stat. 2389, 2405 (2010) (rescinded \$1.5 billion for state educational funding); Pub. L. No 111-47, 123 Stat. 1972 (2009) (providing \$2 billion for the "Cash for Clunkers" Program).

221. Federal Loan Guarantees for Commercial Technology Renewable Energy Generation Projects Under the Financial Institution Partnership Program: Solicitation Number: DE-FOA-0000166, LG PROGRAM 1, <http://www.lgprogram.energy.gov/wp-content/uploads/2010/09/CTRE.pdf>.

222. *Id.* at 6-8.

223. *Id.*

224. *Id.*

225. *Id.*

226. *Id.*

projects and section 1705 transmission projects under which the DOE guarantee can cover 100% of the loan amount — 80% of the total project costs — if that loan is through the auspices of the FFB.²²⁷

As of the publication of this article, the DOE has issued twenty-six loan guarantees under the section 1705 Loan Guarantee authority, representing almost \$34.7 billion in loans for clean energy development.²²⁸ Of these loans, three are in default: (1) the \$352 million Solyndra California solar panel manufacturing concern, (2) Beacon Power, a battery company in upstate New York that borrowed \$39 million, and (3) Abound Solar, a \$400 million loan for a solar manufacturing facility in Colorado.²²⁹ These defaults represent just 2.8% of the \$34.7 billion clean energy loan portfolio.

3. *Department of Agriculture Loan Guarantee Programs for Biofuels*

a. USDA Biorefinery Assistance Loan Guarantee Program

Section 9003 of the Farm Bill of 2008 authorizes a USDA loan guarantee program for the development, construction, and retrofitting of commercial-scale biorefineries that convert renewable biomass to advanced biofuels and other bioproducts using eligible technology.²³⁰ The program is

227. *Id.*

228. *The Financing Force Behind America's Clean Energy Economy*, LOAN PROGRAMS OFFICE, https://lpo.energy.gov/?page_id=45 (last visited in Sept. 212012).

229. Michael Mendelsohn, *Looking Under the Hood: Some Perspective on the Loan Guarantee Program*, NATIONAL RENEWABLE ENERGY MONOGRAPH, (Dec. 28, 2011), <https://financere.nrel.gov/finance/content/looking-under-hood-some-perspective-loan-guarantee-program>; Mark Stricherz, *Dems. Solar Industry Defend Abound Loan, DOE Program*, THE COLORADO OBSERVER, (July 19, 2012), <http://thecoloradoobserver.com/2012/07/dems-defend-abound/>.

230. Pub. L. No. 110-234, § 9003, 122 Stat. 923, 1310-13 (2008) (codified at 7 U.S.C. § 8103 (Supp. 2010)). The term “renewable biomass” means “(A) materials, pre-commercial thinnings, or invasive species from National Forest System land and other public lands; or (B) any organic matter that is available on a renewable or recurring basis from non-Federal land or [certain Indian lands].” *Id.* § 8101(12). The term “advanced biofuel” means:

fuel derived from renewable biomass other than corn kernel starch[, including:] (i) biofuel derived from cellulose, hemicellulose, or lignin; (ii) biofuel derived from sugar and starch (other than ethanol derived from corn kernel starch); (iii) biofuel derived from waste material, including crop residue, other vegetative waste material, animal waste, food waste, and yard waste; (iv) diesel-equivalent fuel derived from renewable biomass, including vegetable oil and animal fat; (v) biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass; (vi) butanol or other alcohols produced through the conversion of organic matter from renewable biomass; and (vii) other fuel derived from cellulosic biomass.

Id. § 8101(3).

administered through USDA's Rural Business-Cooperative Service.²³¹ The program targets emerging technologies that are being or can be adopted by a viable commercial-scale operation that produces advanced biofuel or other bioproducts.²³² Eligible entities under the program include individuals, entities, Indian tribes, or units of state or local government, including corporations, farm cooperatives, farmer cooperative organizations, and associations of agricultural producers, national laboratories, institutions of higher education, rural electric cooperatives, public power entities, or consortia of any of those entities.²³³

The February 2011 Program Interim Final Rule clarifies the existing USDA practice of accepting bond financing as a basis for the guaranteed debt, but only when the bond financing flows through the existing USDA-approved system of traditional lender-based credit facilities; it also extends eligible projects beyond traditional rural areas and to concerns that are foreign-owned.²³⁴ The loans guaranteed cannot be more than 80% of the total project costs, and the federal guarantee for some projects can be up to 90% of total principal and interest,²³⁵ with the maximum loan guarantee amount capped at \$250 million for any individual project. Completed applications must be submitted by the project lender and must contain documents that address critical review areas.²³⁶ Guarantees are awarded based on a competitive scoring system that follows the review criteria established in program regulations,²³⁷ including whether the applicant has established a market for the advanced biofuel produced, whether other similar facilities are located in the project area, whether the applicant proposes to work with producer associations or cooperatives, the rural character of the project site, and the level of local ownership proposed in

231. This loan guarantee program is implemented under USDA's generic loan guarantee regulations found at 7 C.F.R. §§ 4280.121–200. On February 14, 2011, USDA published an interim final rule for the section 9003 program, which instituted substantial changes to facilitate program participation and the availability of private sector debt instruments under the program. 76 Fed. Reg. 8404, 8461 (Feb. 14, 2011) (to be codified at 7 C.F.R. pts. 4279, 4287).

232. 7 U.S.C. § 8103(a)(2)(A) (2006).

233. *Id.* § 8103(b).

234. 76 Fed. Reg. 8404, 8413, 8415, 8418 (Feb. 14, 2011) (to be codified at 7 C.F.R. pts. 4279, 4287).

235. *Id.* at 8466. Loans under \$125 million are eligible for the 90% federal guarantee if the borrower also agrees to provide at least 40% equity in the project and other conditions are met. *Id.* Otherwise the maximum guarantee is 80% of the loan; loans above \$150 million are subject to a maximum 70% guarantee. *Id.*

236. 7 C.F.R. § 4279.261 (2011).

237. *Id.* § 4279.265.

the application.²³⁸ In February 2011, USDA made \$463 million available to fund up to five additional biorefinery projects under this program.²³⁹

b. USDA Rural Energy for America Loan and Loan Guarantee Program

The Rural Energy for America Program (REAP) Loan and Guaranteed Loan Program encourages the commercial financing of renewable energy — bioenergy, geothermal, hydrogen, solar, wind, and hydropower — and energy efficiency projects.²⁴⁰ The program is administered through the USDA Rural Development Agency's Rural Business-Cooperative Service.²⁴¹ Under this competitive loan guarantee program, project developers work with local lenders, who in turn can apply to USDA Rural Development for a loan guarantee up to 85% of the loan amount.²⁴² The maximum loan amount for a guarantee is \$25 million, and the guaranteed portion of the loan is capped at 60% for loans over \$10 million.²⁴³ The loan cannot be more than 75% of the total project cost of the system.²⁴⁴ The agency will assess a guarantee fee equal to 1% of the guaranteed amount, with an annual renewal fee of 0.25% of the guaranteed amount.²⁴⁵ The eligible applicants are agricultural producers and small rural businesses that are at least 51% owned by individuals who are either United States citizens or legal permanent residents.²⁴⁶ USDA further requires applicants to provide cash equity commitments of 15% of total project costs for loans

238. *Id.* § 4279.265(d).

239. Notice of Funds Availability (NOFA) Inviting Applications for the Biorefinery Assistance Program, 76 Fed. Reg. 13,351, 13,351-53 (Mar. 11, 2011).

240. Eligible purposes for loan guarantees under REAP for purchase and installation of a renewable energy system or energy efficiency improvement include: post-application purchase and installation of equipment; post-application construction or project improvements; energy audits and assessments; permit and license fees; professional service fees; feasibility study; business plan; retrofitting; construction of a new energy-efficient facility only when the facility is used for the same purpose, is approximately the same size, and based on the energy audit will provide more energy savings than improving an existing facility; and working capital and land acquisition (Personal knowledge of author acting as DOE chief counsel for thirty years).

241. The REAP Loan and Loan Guarantee Programs operate under 7 C.F.R. §§ 4280.101-4290.116 (loans) and 7 C.F.R. §§ 4280.121-.200 (loan guarantees).

242. The 85% maximum guarantee is for projects costing less than \$600,000. The maximum for loans under \$5 million but over \$600,000 is 80%, and the maximum for loans less than \$10 million but more than \$5 million is 70%. 7 C.F.R. § 4280.123(c).

243. Notice of Solicitation of Applications (NOSA) for Inviting Applications for Renewable Energy Systems and Energy Efficiency Improvements Grants and Guaranteed Loans and Renewable Energy Feasibility Studies Grants under the Rural Energy for America Program, 74 Fed. Reg. 24,769, 24,769-81 (May 26, 2009).

244. *Id.*

245. *Id.*

246. *Id.*

of \$600,000 or less and 25% for loans greater than \$600,000.²⁴⁷ Adverse decisions on awards of guarantees are appealable to USDA's National Appeals Division.²⁴⁸

F. OTHER FEDERAL FINANCIAL INCENTIVES FOR THE DEVELOPMENT OF CLEAN ENERGY TECHNOLOGIES

1. *Clean Renewable Energy Bonds (CREBs)*

Clean Energy Renewable Bonds (CREBs) were created under the Energy Tax Incentives Act of 2005²⁴⁹ and codified as amended at § 54 of the Internal Revenue Code of 1986 (Code). CREBs serve as a financing tool for public entities comparable to the production tax credit available to private developers and investor-owned utilities under § 54. Qualified public entities may issue CREBs to finance renewable energy projects with the federal government providing a tax credit to bondholders in lieu of interest payments from the issuer.²⁵⁰ Recent legislation allows the CREBs issuer to elect to receive a direct payment from the federal government equal to, and in lieu of, the tax credits otherwise available.²⁵¹ Initially, the CREBs program was funded with \$800 million.²⁵² This amount was increased to \$1.2 billion by the Tax Relief and Health Care Act of 2006.²⁵³ The Secretary of the Treasury (Secretary) allocated the funds among qualified projects, as it deemed appropriate, except that qualified governmental borrowers were not permitted to receive more than \$750 million.²⁵⁴

Entities qualified to issue CREBs include mutual or cooperative electric companies, "clean renewable energy bond lenders" (such as the National Rural Utilities Cooperative Finance Corporation), and certain governmental bodies.²⁵⁵ At least 95% of the proceeds of a CREB must be

247. *See generally id.*

248. 7 C.F.R. pt. 11, subpt. A.

249. Pub. L. No. 109-58, § 1303, 119 Stat. 594, 991-97 (2005) (codified as amended at I.R.C. § 54 (2009)).

250. I.R.C. §§ 54(f), 54(a) (2006).

251. Pub. L. No. 111-147, § 301, 124 Stat. 71, 77-78 (2010).

252. Pub. L. No. 109-58, § 1303, 119 Stat. 594, 991-97 (2005); I.R.C. § 54(f)(1).

253. Pub. L. No. 109-432, § 202, 120 Stat. 2922, 3008-15 (2006).

254. *See* I.R.C. § 54(f).

255. *See id.* § 54(j)(4). Section 54(j) defines a "cooperative electric company" as "a mutual or cooperative electric company described in [§] 501(c)(12) or [§] 1381(a)(2)(C), or a not-for-profit electric utility which has received a loan or loan guarantee under the Rural Electrification Act"; a "clean renewable energy bond lender" as "a cooperative which is owned by, or has outstanding loans to, 100 or more cooperative electric companies and is in existence on February 1, 2002"; and "governmental body" as "any State, territory, possession of the United States, the

used for capital expenditures incurred by qualified borrowers for qualified projects.²⁵⁶ Only governmental bodies and mutual or cooperative electric companies are qualified CREBs borrowers.²⁵⁷ Projects that qualify for CREBs financing are those energy generation projects owned by a qualified borrower that would otherwise qualify for an energy production tax credit under § 54, including facilities that generate electricity from renewable sources such as wind, solar, closed-loop biomass, open-loop biomass, geothermal, small irrigation, qualified hydropower, landfill gas, marine renewables, and trash combustion.²⁵⁸

The Internal Revenue Service (IRS) issues guidance and solicits applications each time Congress makes a CREB authorization.²⁵⁹ Applicants are required to identify the relevant parties, explain the project in detail, and include certifications by an independent engineer on the project's viability, as well as a description of plans to obtain all necessary federal, state, and local approvals for the project.²⁶⁰ On the date of issuance, a CREB issuer must reasonably expect that (1) at least 95% of the proceeds of the issuance will be spent for one or more qualified projects within five years,²⁶¹ (2) a binding commitment with a third party to spend at least 10% of the proceeds will be incurred within six months, and (3) such projects will be completed, and the proceeds of the issue will be spent, with diligence.²⁶²

CREB issuers repay principal with level annualized payments over the entire term of the bond, but they do not pay interest to bondholders.²⁶³ Instead, the federal government directly provides a tax credit against the bondholder's income tax liability in lieu of interest payments from the

District of Columbia, Indian tribal government, and any political subdivision thereof." *Id.* § 54(j)(1)-(3).

256. *Id.* § 54(d)(1)(B).

257. *See id.* § 54(j)(5).

258. *See id.* § 54(d)(2); *see also* I.R.S. Notice 2006-7, 2006-10 I.R.B. 559 (clarifying that any facility that is "functionally related and subordinate" to a qualified generation facility is also eligible for CREBs financing, including radial transmission lines, offices, storage, and so forth).

259. *See, e.g.,* I.R.S. Notice 2009-33, 2009-17 I.R.B. 865; I.R.S. Notice 2009-15, 2009-6 I.R.B. 449; I.R.S. Notice 2007-26, 2007-14 I.R.B. 870.

260. I.R.S. Notice 2007-26, 2007-14 I.R.B. 870.

261. The Secretary of the Treasury may extend the applicable five-year period if the issuer submits a request prior to the expiration of the period and establishes that the failure to meet the five-year requirement is due to reasonable cause and the related projects will continue with due diligence. However, if an issuer fails to spend 95% of the proceeds of the issue within the specified period, including any applicable extension period, the issuer must redeem all nonqualified bonds within ninety days after the expiration of the period. *See* I.R.C. § 54(h) (2006).

262. *See id.* § 54(h)(1).

263. *Id.* § 54(l)(4).

issuer.²⁶⁴ The tax credit thereby shifts the cost to fund renewable energy power generation projects from the issuers to the federal government and reduces the costs of the debt. Since the CREBs tax credit is included in the holder's gross income, the value of the CREBs to a bondholder is equal to the amount of the credit less the tax payable on the credit.²⁶⁵ CREB's design, therefore, differs significantly from tax-exempt municipal bonds, which require issuers to pay cash payments to bondholders that the federal government exempts from federal taxes.²⁶⁶ The tax-exempt design allows bond issuers to offer bond rates that are lower than corporate bonds of a similar rating. The maximum term for CREBs is set by the Secretary based on an estimate of the present value of the cost to repay 50% of the principal of the CREBs.²⁶⁷ Generally, the maximum term for CREBs has been between fourteen and fifteen years.

In 2008, the Energy Improvement and Extension Act of 2008²⁶⁸ (the Energy Act) authorized \$800 million of funding for New Clean Renewable Energy Bonds (New CREBs) under § 54C and extended the issuance deadline for standard CREBs by one year to December 31, 2009.²⁶⁹ The Recovery Act tripled the new CREB allocation to \$2.4 billion.²⁷⁰ New CREBs in the amount of \$2.2 billion were awarded on October 27, 2009 to over 805 recipients nationally.

All of the available proceeds from a new CREB issuance must be used for capital expenditures incurred by governmental bodies, public power providers, or cooperative electric companies for one or more qualified renewable energy facilities.²⁷¹ A public power provider is a "State Utility" with a "Service Obligation," as such terms are defined in section 217 of the Federal Power Act.²⁷² Entities that qualify to issue CREBs may also issue new CREBs.²⁷³ In addition, any not-for-profit electric utility that has received a loan or loan guarantee under the Rural Electrification Act may

264. *Id.* § 54(a).

265. *See id.* § 54(g).

266. *Compare* I.R.C. § 75, with *id.* § 54.

267. I.R.C. § 54(e)(2). The Secretary shall make this determination using a discount rate equal to the average annual interest rate of tax-exempt obligations with a term of at least ten years that are issued during the month of issuance. *Id.*

268. Pub. L. No. 110-343, § 107, 122 Stat. 3765, (2008).

269. *See* I.R.C. § 54(m).

270. American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, § 1111, 123 Stat. 115, 322 (2009).

271. *See* I.R.C. § 54C(a). Two percent of the bond issue may be used for certain issuance costs. *Id.*

272. *Id.* § 54C(d)(2).

273. *Id.* § 54C(d)(6).

issue new CREBs.²⁷⁴ Projects that qualify for new CREBs are those energy generation projects that would otherwise qualify for a production tax credit under § 54C owned by a qualified borrower, except that new CREBs cannot be used to finance certain coal production facilities.²⁷⁵

One-third of the \$2.4 billion allocation for new CREBs, or \$800 million, was required to be allocated by the Secretary to be made available to each category of applicant: governmental bodies, cooperative electric utilities, and public power providers.²⁷⁶ For government bodies and cooperatives, the Secretary awarded projects from smallest to largest until \$800 million for each category was exhausted or all applications were granted.²⁷⁷ However, for the public power providers category, the Secretary allocated funds without regard to project size such that each project received a pro rata share of the overall allocation of funds to this category based on the fraction of total amount requested for a project to the total amount requested for all public power providers' projects.²⁷⁸ Projects that receive an allocation of new CREBs have three years to issue the bonds.²⁷⁹

There are, in fact, several significant differences between CREBs and new CREBs. The IRS reduced the tax credit that is paid with respect to new CREBs so they receive a tax credit equal to 70% of the amount that would otherwise be available for an equivalent CREB.²⁸⁰ However, the new CREB tax credit may be applied against both regular and alternative minimum tax liability.²⁸¹ Also, CREB issuers repay principal using straight-line amortization so that a CREB borrower receives tax credit on the full amount of the bond for the entire term.²⁸² In contrast, borrowers of new CREBs are repaid the entire principal in a balloon payment at the bond's maturity.²⁸³

The credit rate methodology was also revised for new CREBs. In 2006 and 2007, the Secretary set CREBs credit rates based on the market rate for

274. *Id.* § 54C(d)(6).

275. *See id.* § 54C(d)(1).

276. *Id.* § 54C(c)(2), (3).

277. *Id.* § 54C(c)(3)(b).

278. *Id.* § 54C(3)(a).

279. *See* I.R.S. Notice 2009-33, 2009-17 I.R.B. 865, 870. Written notice must be provided to the IRS once an issuer determines that bonds will not be issued within the applicable three-year period and those bonds will be considered forfeited and available for reallocation. *Id.*

280. *See* I.R.C. § 54C(b).

281. *See id.* § 54A(c).

282. I.R.C. § 54(l)(4).

283. I.R.C. §§ 54A(b)(3), 54A(a) and 54A(d)(5). These statutes do not address balloon payments.

AA-rated corporate bonds.²⁸⁴ However, many municipalities had credit ratings below AA. Because many investors were unfamiliar with CREBs, many issuers had to discount or pay supplementary interest to investors. As a result, the credit rate for new CREBs is determined based on yield estimates on outstanding bonds with grade ratings between A and BBB for similar maturities.²⁸⁵

Another difference between the new CREBs and CREBs is, in order to increase liquidity; investors can strip the tax credits from new CREB principal payments and sell them separately.²⁸⁶ Finally, CREBs, like tax-exempt bonds, are subject to investment yield restrictions and certain arbitrage requirements under § 148.²⁸⁷ However, the Energy Act liberalized arbitrage rules for new CREBs, allowing issuers to set aside project revenues in equal installments annually into a sinking fund in order to accumulate funds needed to pay CREBs when due.²⁸⁸

CREBs were created to reduce the financing challenges for states and local government to finance renewable energy projects. The amended CREBs and new CREBs program rules are intended to further attract investors for such projects. Going one step further to reduce financing challenges, the Commerce, Justice, Science, and Related Agencies Appropriations Act of 2010 (the HIRE Act).²⁸⁹ Enacted on March 19, 2010, this Act allows issuers of qualified bonds, such as new CREBs issued after the bill's enactment, and other qualified issuers to elect to receive a direct payment from the federal government equal to, and in lieu of, the amount of the federal tax credit that would otherwise be provided for the bonds to bondholders.²⁹⁰ Issuers electing to receive the payments directly from the Treasury will pay taxable interest to bondholders, and bondholders cannot claim a tax credit.²⁹¹ However, by monetizing the tax credits into a direct payment to the issuer, the HIRE Act provides direct funding to

284. *See* TreasuryDirect, <https://www.treasurydirect.gov/GA-SL/SLGS/selectCREBDate.htm>, (last visited Oct. 4, 2012) (setting out the history of CREBs credit rates).

285. I.R.S. Notice 2009-15, 2009-6 I.R.B. 449. The Department of Treasury will determine and announce credit rates for tax credit bonds daily, based on its estimate of the yields on outstanding bonds from market sectors selected by the Treasury in its discretion that have an investment grade rating of between A and BBB. *Id.* (modifying I.R.S. Notice 2007-26, 2007-14 I.R.B.).

286. I.R.C. § 54A(i)(1)&(2).

287. I.R.C. § 54(i).

288. I.R.C. § 54A(d)(4)(A).

289. Hiring Incentives to Restore Employment Act of 2010, Pub. L. No.111-147, § 301, 124 Stat. 71,77 (2010).

290. *Id.*

291. *Id.*

issuers for qualified renewable energy projects and reduces the total amount of debt the issuer must incur to finance a qualified project.

2. *Qualified Energy Conservation Bonds (QECCBs)*

The Energy Act also created a credit bond program for “qualified energy conservation bonds” (QECCBs) under § 54D, which was later amended by the Recovery Act.²⁹² QECCBs are issued by states and large local governments²⁹³ to finance certain types of qualified energy conservation projects.²⁹⁴ Like CREBs and new CREBs, the federal government directly provides a tax credit against a bondholder’s income tax liability in lieu of interest payments from the issuer.²⁹⁵ Also, the Hire Act applies to QECCBs and allows issuers to elect to receive a direct payment instead of the federal government providing a tax credit to borrowers.²⁹⁶ A total of \$3.2 billion was allocated among the states for QECCBs in proportion to each state’s population.²⁹⁷

All available project proceeds of a QECCBs issue must be used for qualified conservation purposes.²⁹⁸ Qualified conservation purposes include any of the following:

- (A) Capital expenditures incurred for the purposes of—
 - (i) reducing energy consumption in publicly-owned buildings by at least [20%],
 - (ii) implementing green community programs [such as the use of loans, grants, or other repayment mechanisms to implement such programs],
 - (iii) rural development involving the production of electricity from renewable energy resources, or
 - (iv) any facility [that qualifies for production tax credits under Code [S]ection 45(d), except refined coal and Indian coal production facilities].
- (B) Expenditures with respect to research facilities, and research grants, to support research in—

292. I.R.C. § 54D.

293. A “large local government” is any municipality or county with population of one hundred thousand or more. *Id.* § 54D(e)(2)(C).

294. *Id.* § 54D(f).

295. *Id.* § 54D(b).

296. § 301, 124 Stat. at 77.

297. I.R.C. § 54D(e); I.R.S. Notice 2009-29, 2009-16 I.R.B. 849. Allocations to largest local governments are allocated a portion of the state’s allocation based on the ratio of the population of large local government to the population of the state. I.R.C. § 54D(e)(2)(a). Any unused portion can be reallocated to the state. *Id.* § 54D(e)(2)(b).

298. *See* I.R.C. § 54D(a).

(i) development of cellulosic ethanol or other non-fossil fuels, (ii) technologies for the capture and sequestration of carbon dioxide produced through the use of fossil fuels, (iii) increasing the efficiency of existing technologies for producing non-fossil fuels, (iv) automobile battery technologies and other technologies to reduce fossil fuel consumption in transportation, or (v) technologies to reduce energy use in buildings.

(C) Mass commuting facilities and related facilities that reduce the consumption of energy, including expenditures to reduce pollution from vehicles used for mass commuting.

(D) Demonstration projects designed to promote the commercialization of—

(i) green building technology, (ii) conversion of agricultural waste for use in the production of fuel or otherwise, (iii) advanced battery manufacturing technologies, (iv) technologies to reduce peak use electricity, or (v) technologies for the capture and sequestration of carbon dioxide emitted from combusting fossil fuels in order to produce electricity.

(E) Public education campaigns to promote energy efficiency.²⁹⁹

QECB holders further receive a tax credit on quarterly credit allowance dates. The annual tax credit with respect to QECBs is 70% of the amount otherwise determined for qualified tax credit bonds under § 54A.³⁰⁰ Unlike CREBs and new CREBs, there is no concept of a “qualified borrower” for QECBs, and QECBs may be private activity bonds. However, no more than 29.9% of each allocation to a state or large local government may be issued as private activity bonds with proceeds loaned to a nongovernmental entity, and private activity bonds may be issued only to finance capital expenditures.³⁰¹

III. FEDERAL TAX INCENTIVES FOR CLEAN ENERGY

A. INTRODUCTION

The use of the federal tax code as a stimulus for the deployment of commercial-ready and proven clean energy technology into the market place has been the most effective mechanism in encouraging investment to

299. *Id.* § 54D(f)(1).

300. *Id.* § 54D(b).

301. *Id.* §§ 54D(e)(3), 54(f)(2). Bonds issued to provide loans, grants, or repayment mechanisms for capital expenditures to implement green community programs are not treated as private activity bonds. *Id.* § 54D(e)(4).

advance the clean technology sector of the United States economy. Clean technology developers are confronted with high start-up costs of putting capital-intensive production facilities online in the post-Recovery Act economic climate. The high start-up costs make the use of tax incentives imperative to future development in this sector. New technology increasing the efficiency of renewable energy production combined with federal tax incentives like the Investment Tax Credit, the Production Tax Credit, the Manufacturing Tax Credit, the Treasury Grant Program, and the tax incentives for renewable fuels may allow cleaner energy sources to serve as a cost effective alternative to energy from traditional sources. In the 1970s, Congress took the first steps in facilitating the development of renewable energy in the United States through federal tax incentives.³⁰²

Approximately thirty-two years ago, Congress passed the Energy Tax Act of 1978.³⁰³ The Act marked the beginning of the government use of federal tax incentives to promote the development of renewable energy sources.³⁰⁴ The original tax credits found in the Energy Tax Act included a 10% Investment Tax Credit (ITC) equal to the eligible basis of equipment purchased to produce renewable energy.³⁰⁵ Under the Act,³⁰⁶ only solar and geothermal energy were eligible for the ITC, and the ITC was not increased from 10% of eligible basis until 2005 when Congress increased it to 30% of eligible basis for property purchased through December 31, 2007.³⁰⁷

Several different tax incentives have developed since the passage of the Energy Tax Act in 1978. The types of federal tax incentives that exist today for renewable energy are the Investment Tax Credit, the Production Tax Credit, the Manufacturing Tax Credit, the grant in lieu of tax credits and several tax credits provided for fossil fuels. It is estimated that in 2010, \$6.7 billion in tax incentives were provided to renewable energy generation

302. See e.g., Mann & Rowe, Ch. 7 Taxation, *The Law of Clean Energy: Efficiency and Renewables*, 145-50 (M. Gerrard ed. 2011).

303. Mona Hymel, *The United States' Experience with Energy-Based Tax Incentives: The Evidence Supporting Tax Incentives for Renewable Energy*, 38 LOY. U. CHI. L.J. 43, 54 (2006).

304. See, Moeller *supra* note 17, at 72.

305. *Id.* at 55.

306. One of the most significant of the five bills that were consolidated with the Energy Tax Act of 1978 was the Public Utilities Regulatory Policies Act (PURPA) of 1978. James W. Moeller, *Of Credits and Quotas: Federal Tax Incentives for Renewable Resources, State Renewable Portfolio Standards, and the Evolution of Proposals for a Federal Renewable Portfolio Standard*, 15 FORDHAM ENVTL. L. REV. 69, 72 (2004). Specifically, section 210 of PURPA helped advance the production of renewable energy by requiring electric utilities to purchase electric power produced by qualified cogeneration and small alternative power energy producers. *Id.* at 73. The section was of great importance since it provided a market for renewable energy producers.

307. Hymel, *supra* note 303, at 55.

projects and another \$6.3 billion was provided for renewable fuels.³⁰⁸ The purpose of this section is to give a brief history of these tax credits, explain what they do and describe their present state. In addition, this section will explain how the Recovery Act impacted each of these tax credits. Finally, this section will summarize the future of federal tax credits for renewable energy and their importance in the future development of the renewable energy industry.

B. RENEWABLE ENERGY TAX CREDITS

1. *Investment Tax Credit*

The investment tax credit (ITC) was the first federal tax credit implemented to promote renewable energy development. The ITC directed at renewable energy was first authorized under the Energy Tax Act of 1978.³⁰⁹ Section 48 of the Code “authorizes a tax credit of [10%] of the cost of equipment purchased and installed for the generation of electric power from solar or geothermal resources.”³¹⁰ The ITC was modified several times, once in section 301 of the 1978 Energy Tax Act, once in section 221 of the Crude Oil Windfall Profits Tax Act of 1980, and then again in the Tax Reform Act of 1986.³¹¹

In 1992, Congress passed the Energy Policy Act, and section 1916 of the Energy Policy Act of 1992 made the ITC a permanent feature of the Code.³¹² Later, in 2005, Congress increased the ITC to 30% of the eligible basis of equipment purchased through December 31, 2007.³¹³ The ITC was extended for an additional year in 2006 by the Tax Relief and Health Care Act of 2006,³¹⁴ amended again in 2008 by the Emergency Economic Stabilization Act of 2008, and last modified by the Recovery Act.³¹⁵

The Code outlines the requirements for a producer to qualify for the ITC. The Code has been amended several times in relation to the ITC and “[a]fter its amendment by the JOBS Act, Code [§] 46 states that the investment credit is equal to the sum of four different tax credits which

308. Molly F. Sherlock, *Energy Tax Incentives: Measuring Value Across Different Types of Energy Resources*, Congressional Research Service, 7-5700, 7 (Sept. 2012).

309. See Moeller, *supra* note 17, at 82.

310. *Id.*

311. *Id.* at 84-86.

312. *Id.* at 87.

313. Hymel, *supra* note 303, at 55.

314. *Solar Investment Tax Credit*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/cs/solar_policies/solar_investment_tax_credit (last visited Sept. 22, 2010).

315. *Id.*

include the energy credit, under Code [§] 48.³¹⁶ The energy credit now defined in Code Section 48 is what we refer to as the ITC.

Under § 48, a taxpayer may take the ITC on certain energy property placed in service in the taxable year.³¹⁷ The ITC is 30% of the basis for certain types of energy property including qualified fuel cell property, certain types of solar energy, and qualified small wind energy property.³¹⁸ There are other types of energy property that are only eligible for a 10% ITC and these are geothermal energy, qualified fuel cell property, qualified microturbine property and combined heat and power system property.³¹⁹

Since its establishment in 1978, the renewable energy ITC has been allowed to expire several times.³²⁰ The uncertainty surrounding the ITC and the other tax incentives in the past discouraged investors and stunted the development of renewable energy.³²¹ Fortunately, the future of the ITC is stable, and it was extended by the Recovery Act for eligible investment made on or before December 31, 2016.³²²

2. *Production Tax Credit*

The history of the production tax credit (PTC) dates back to 1992, when it was created by Title 19 of the Energy Policy Act of 1992.³²³ Like the ITC, the PTC is intended to provide a tax credit for private producers of renewable energy in hopes of stimulating investment in the renewable energy field.³²⁴ However, the PTC credit amount is based on the issuer's successful production of energy, not merely the developer's investment in an eligible facility.³²⁵

Under the Energy Policy Act of 1992, only qualified energy resources (QERs) were eligible for a PTC. QERs included wind energy, closed-loop

316. *Id.*

317. *See id.* at 184-85.

318. I.R.C. § 48(a)(2)(A)(i)-(ii), (a)(3)(A)(i)-(vii) (2009).

319. *See id.* § 48(a)(2)(A)(ii), (a)(3)(iii)-(vii).

320. *See Moeller, supra* note 17, at 86-89.

321. *See generally Clean Energy Tax Incentives: The Effect of Short-Term Extensions on Clean Energy Investment, Domestic Manufacturing, and Job Creation Before S. Comm. on Fin. Subcomm. on Energy, Natural Res., & Infrastructure* 112th Cong. (2011) (statement of Molly Sherlock), *available at* <http://www.finance.senate.gov/imo/media/doc/Testimony%20of%20Molly%20Sherlock.pdf>.

322. *Solar Investment Tax Credit, supra* note 314.

323. Herrick, *supra* note 25, at 101.

324. *See, e.g.,* MICHAELA D. PLATZER, CONG. RESEARCH SERV., 7-5700, U.S. WIND TURBINE MANUFACTURING: FEDERAL SUPPORT FOR AN EMERGING INDUSTRY 28 (2011), *available at* <http://www.scribd.com/doc/68803418/32/Figure-6-History-of-the-Production-Tax-Credit>.

325. I.R.C. § 45(a).

biomass, and poultry waste facilities.³²⁶ Section 1914 of the Energy Policy Act of 1992 allowed a PTC for wind and closed-loop biomass facilities that were brought into service between December 31, 1993, and July 1, 1999.³²⁷ Section 507 of the Ticket to Work and Work Incentives Improvement Act of 1999 extended the PTC to qualified facilities placed in service before January 1, 2002,³²⁸ and amended § 45 to prohibit the producers from claiming the PTC for certain power sold to electric utilities.³²⁹ Congress expanded the QERs eligible for the PTC in 2004 and again in 2005. Currently, the QERs eligible for the PTC are wind, solar, geothermal, poultry waste facilities, small irrigation power, refined coal, municipal solid waste, hydroelectric power facilities, and Indian coal facilities.³³⁰

Like the ITC, Congress has allowed the PTC to expire and then extended it several times. The PTC was first allowed to expire December 31, 2001.³³¹ In 2002, the Job Creation and Worker Assistance Act of 2002 reinstated the PTC, but the PTC was again allowed to expire on December 31, 2003.³³² The PTC was extended by the 110th Congress for one year and was set to expire on December 31, 2009.³³³ The Recovery Act extended the PTC through December 31, 2012 for wind energy.³³⁴ However, other types of qualified renewable energy projects may qualify for a PTC if placed in service before January 1, 2014.³³⁵

The PTC is set forth in § 45, and currently, “[§] 45 of the Code authorizes an electric power production credit of [\$0.015] per [kilowatt-hour] for electric power generated from ‘qualified’ resources at ‘qualified’ facilities for a ten-year period from commencement of operations.”³³⁶ Section 45 “defines qualified resources in terms of wind, closed-loop

326. Hymel, *supra* note 303, at 56.

327. Moeller, *supra* note 17, at 90.

328. *Id.*

329. *Id.* at 91.

330. *Id.*

331. Job Creation and Worker Assistance Act of 2002, Pub. L. No.107-147, §603(b), 116 Stat. 21 (2002).

332. *Id.*

333. Emergency Economic Stabilization – Energy Improvement and Extension – Tax Extenders and Alternative Minimum Tax Relief Act of 2008, Pub. L. No. 110-343, § 101(a), 122 Stat. 3765 (2008); see generally *Wind Energy for a New Era: An Agenda for the New President and Congress*, AM. WIND ENERGY ASS’N 8 (2008), available at http://www.newwindagenda.org/documents/Wind_Agenda_Report.pdf.

334. Pub. L. No 111-5, Div. B § 1101(a)(1).

335. I.R.C. § 45(d)(2)-(4), (6)-(7), (9), (11) (Supp. 2010).

336. Moeller, *supra* note 17, at 89.

biomass and poultry waste.”³³⁷ The maximum credit available under the PTC is \$0.021 per kilowatt-hour.³³⁸

The PTC is intended to help develop wind and solar power; however, due in part to the fact that the PTC is not a permanent tax credit, the development of renewable energy in the United States has lagged behind the rest of the world.³³⁹ The Recovery Act extended the PTC and made important changes to the PTC that will allow for certain renewable energy sources to elect to take the ITC or a cash grant in lieu of the PTC.³⁴⁰

3. *Manufacturing Tax Credit*

In addition to the ITC and the PTC, the Recovery Act allows for a manufacturing tax credit (MTC). The MTC is a tax credit granted to facilitate clean energy manufacturing projects in the United States.³⁴¹ Neither the PTC nor the ITC are available to support manufacturing facilities in the clean energy sector. President Obama established the importance of the MTC when he stated, “[t]he Recovery Act awards I am announcing today will help close the clean energy gap that has grown between America and other nations while creating good jobs, reducing our carbon emissions and increasing our energy security.”³⁴²

The MTC was authorized in section 1302 of the Recovery Act and is codified in § 48C.³⁴³ Under the Recovery Act, the Secretary of Treasury was authorized to work with the Secretary of Energy in the application of the MTC.³⁴⁴ The objective of the MTC is to facilitate the domestic growth of the manufacturing industry for renewable energy in order to create jobs, reduce the emission of greenhouse gases, and stimulate the economy.³⁴⁵ The MTC was also intended to help establish the United States as a leader in the renewable energy sector.³⁴⁶

337. *Id.*

338. *Energy Incentives for Businesses in the American Recovery and Reinvestment Act*, IRS <http://www.irs.gov/newsroom/article/0,,id=209564,00.html> (last updated June 17, 2011) [hereinafter *Energy Incentives for Businesses*].

339. Hymel, *supra* note 303, at 75-76.

340. *See generally*, MARK BOLINGER ET AL., PTC, ITC, OR CASH GRANT?: AN ANALYSIS OF THE CHOICE FACING RENEWABLE POWER PROJECTS IN THE UNITED STATES (Mar. 2009), available at <http://eetd.lbl.gov/ea/emp/reports/lbnl-1642e.pdf>.

341. *President Obama Awards \$2.3 Billion for New Clean-Tech Manufacturing Jobs*, THE WHITE HOUSE (Jan. 8, 2010), <http://www.whitehouse.gov/the-press-office/president-obama-awards-23-billion-new-clean-tech-manufacturing-jobs> [hereinafter *Obama Award*].

342. *Id.*

343. American Reinvestment and Recovery Act of 2009, Pub. L. No. 111-5, § 1302, 123 Stat. 115, 345-48 (2009) (codified at I.R.C. § 48C (Supp. 2010)).

344. *Obama Award*, *supra* note 341.

345. *Id.*

346. *Id.*

The MTC allows for a tax credit of up to 30% of qualified investments in qualified manufacturing facilities that produce equipment used in the clean energy sector.³⁴⁷ The Recovery Act defined such facilities as “qualified advanced energy projects” which are projects that re-equip, expand, or establish manufacturing facilities for the production of property that will produce energy from wind, solar, geothermal deposits, and other renewable resources.³⁴⁸ Qualified facilities also include other clean energy manufacturing enterprises that produce fuel cells, microturbines, energy storage for certain electric and hybrid vehicles. In addition the MTC credit is available to facilities that produce equipment for electric grids that support renewable energy transmission and storage, facilities that capture and sequester carbon dioxide emissions, and also facilities that refine and blend renewable fuels.³⁴⁹

The total amount of MTCs allowed under the Recovery Act is \$2.3 billion.³⁵⁰ To receive certification for an MTC, applicants were required to submit their applications for the MTC within two years of the Secretary of Energy establishing the program.³⁵¹ The application period ran from August 14, 2009 to October 16, 2009, and by January 8, 2010, the IRS announced which projects were certified and would receive MTCs.³⁵² Each applicant had one year to provide the Secretary with evidence the certification requirements have been met.³⁵³ Applicants will have three years from the date of issuance of certification to place their manufacturing project in service, but if the applicant does not do so within three years, the certification will be invalid.³⁵⁴ The DOE and the IRS cooperated to determine which MTC applications were approved, and which MTCs were granted based on the viability of projects, and by a comparison to other projects.³⁵⁵

The Secretary of Energy only considered projects with a reasonable expectation of commercial viability.³⁵⁶ However, the Secretary also took into consideration which projects will provide the most jobs, most effectively reduce greenhouse gas emissions, have the most potential for commercial development and technological innovation, operate with the

347. I.R.C. § 48C(a).

348. *Id.* § 48C(c)(1)(A)(i)(I).

349. *Id.* § 48C(c)(1)(A)(i)(II)-(V), (VII).

350. *Id.* § 48C(d)(1)(B).

351. *Id.* § 48C(d)(2)(A).

352. *Obama Award, supra* note 341.

353. I.R.C. § 48C(d)(2)(B).

354. *Id.* § 48C(d)(2)(C).

355. *Obama Award, supra* note 341.

356. I.R.C. § 48C(d)(3)(A).

lowest cost of generated or stored energy, and go from certification to completion the fastest.³⁵⁷

The MTC was critical in the development of a manufacturing industry for renewable energy property in the United States. Although the MTC was oversubscribed by a ratio of three to one, all MTCs have been granted until Congress approves further funding and the future of the MTC is uncertain.

4. *Grant in Lieu of Tax Credit*

Before the Recovery Act, the PTC and the ITC required a developer or purchaser to have income tax liability to offset in order to utilize the tax credit. However, the Recovery Act provided an immensely popular new option. It monetized the tax credits by allowing for a cash grant in lieu of tax credits. The cash grants in lieu of tax credits were created by section 1603 of the Recovery Act.³⁵⁸ Section 1603 allows the U.S. Department of the Treasury to give cash grants to eligible energy property owners who place property in service in accordance with section 1603 and § 48.³⁵⁹ The purpose of the grant in lieu of tax credit is to “provide a grant to each person who places in service specified energy property to reimburse such person for a portion of the expense of such property”³⁶⁰

To be eligible for a section 1603 grant, eligible property must be placed in service during 2009 or 2010, or after 2010 but before the credit termination date for that type of property, as long as construction of the property began in 2009 or 2010.³⁶¹ The Treasury can grant between 10% and 30% of the basis of energy property, depending on which type of property the applicant is constructing.³⁶² Properties listed under section 1603(d)(1)-(4) are eligible for a 30% tax credit.³⁶³ These properties include qualified properties defined in § 48(a)(5)(D) that are part of a qualified facility within the meaning of § 45,³⁶⁴ such as qualified fuel cell property, solar property, and qualified small wind property.³⁶⁵ All other properties, such as geothermal, qualified microturbine property, combined heat and

357. *Id.* § 48C(d)(3)(B).

358. U.S. TREASURY DEP'T, PAYMENTS FOR SPECIFIED ENERGY PROPERTY IN LIEU OF TAX CREDITS UNDER THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 2 (2011), *available at* <http://www.ustreas.gov/recovery/dos/guidance.pdf>.

359. *Id.*

360. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, § 1603(a), 123 Stat. 115, 364-66 (2009).

361. *Id.*

362. *Id.* § 1603(b).

363. *Id.* § 1603(b)(2)(A).

364. *Id.* § 1603(d)(1).

365. *Id.* § 1603(d)(1)-(4).

power system property, and geothermal heat pump property, are eligible for a grant of up to 10% of the basis.³⁶⁶

After the applications for section 1603 grants are reviewed, payments are made “within [sixty] days from the later of the date of the complete application or the date the property is placed in service.”³⁶⁷ However, it is important to note that energy producers who elect to receive a section 1603 grant will not be eligible to receive PTCs or ITCs under § 45 or § 48 for the same property.³⁶⁸ The section 1603 grant is expected to solve the recent problem of lowered investor demand for PTCs and ITCs.³⁶⁹ As with all of the tax credits allowed by the Recovery Act, the ultimate goal behind the section 1603 grants is to create jobs and expand the use of renewable energy³⁷⁰ to allow the United States to decrease its dependency on conventional energy sources.³⁷¹

The section 1603 cash grants in lieu of tax credits are an extremely popular option. By allowing renewable energy investors to monetize the related tax credits, it has created an avenue for investment in projects that would otherwise have been blocked during the economic lull following the Recovery Act due to the dearth of investors with tax liability for the tax credits to offset. The future of the section 1603 grants is uncertain after the grant program expires in 2011. Despite, or perhaps due to, its popularity, it is not clear at this time whether or how Congress may act to extend the section 1603 program.

C. TAX INCENTIVES FOR RENEWABLE FUELS

In addition to creating the ITC to encourage energy production from alternative sources, the Energy Tax Act of 1978 also encouraged alternative fuel production. “The Internal Revenue Code contains three income tax credits designed to encourage ethanol use: the alcohol mixture credit, the pure alcohol credit, and the small ethanol producer’s credit.”³⁷² These tax incentives have resulted in increased production of ethanol in the United States “from 175 million gallons in 1980 to 6.8 billion gallons in 2007.”³⁷³ Despite these increases in ethanol production, there is still a serious debate

366. *Id.* § 1603(b), (d)(5)-(8).

367. U.S. TREASURY DEP’T, *supra* note 358, at 2-3.

368. *Id.* at 3.

369. *Id.*

370. *Id.*

371. *Id.*

372. Mona L. Hymel & Roberta F. Mann, *Moonshine to Motorfuel: Tax Incentives for Fuel Ethanol*, 19 DUKE ENVTL. L. & POL’Y F. 43, 43 (2008).

373. *Id.* at 44.

over whether ethanol production is actually resulting in a net energy gain, or whether the use of food crops for ethanol production will actually have a negative impact on world hunger.³⁷⁴ Regardless of the controversy over the efficiency of ethanol use, it is clear the tax incentives offered for alternative fuel production effectively developed the ethanol fuel industry.

In 1978, the government introduced the first tax incentives for ethanol, with an exemption for alcohol fuels that varied from \$0.40 per gallon to \$0.60 per gallon for pure ethanol between 1978 and 2004.³⁷⁵ In 2005, Congress passed the Energy Act of 2005, which:

[R]estructured federal tax incentives for ethanol production to include three income tax credits and one excise tax credit. As part of the general business credit, the three income tax credits are added together to become the alcohol fuels credit. The alcohol fuels tax credit is the sum of the alcohol fuel mixture credit (or blenders credit), the straight alcohol credit, and the small ethanol producer credit.³⁷⁶

The blender's credit, also called the Volumetric Ethanol Excise Tax Credit (VEETC), is the most important federal tax credit for ethanol.³⁷⁷ The American Jobs Creation Act of 2004 originally created the blender's credit.³⁷⁸ The blender's credit gives ethanol blenders and marketers a tax credit of \$0.45 per gallon of ethanol blended with gasoline.³⁷⁹ The blender's credit provides stability for ethanol producers and has resulted in major increases in the production and use of ethanol.³⁸⁰ Although the blender's credit was scheduled to expire December 31, 2011,³⁸¹ it was extended. It is important to note that in calendar years beginning before 2009 the blender's credit was \$0.51 per gallon.³⁸² Also, alcohol fuel mixtures that do not contain ethanol are eligible for a sixty cent per gallon blender's credit.³⁸³ The blender's credit gives ethanol blenders and marketers a tax credit of \$0.45 per gallon of ethanol blended with gasoline.³⁸⁴ The blender's credit provides stability for ethanol producers

374. *Id.* at 45.

375. *Id.* at 47.

376. *Id.* at 47-48.

377. Renewable Fuels Ass'n, *Federal Tax Incentives: VEETC, ETHANOLRFA*, <http://www.ethanolrfa.org/pages/federal-tax-incentives-veetc> (last visited Feb. 22, 2012).

378. *Id.*

379. *Id.*

380. *Id.*

381. *Id.*

382. I.R.C. § 6426 (b)(2)(A) (2006).

383. *Id.* § 6426 (b)(2)(B).

384. *Id.*

and has resulted in major increases in the production and use of ethanol.³⁸⁵ The blender's credit expired on December 31, 2011, and has not been extended by Congress as of this writing.

The small ethanol producer tax credit is another important federal tax incentive for renewable fuels producers. The current federal law allows for a ten cent per gallon tax credit on a maximum of fifteen million gallons of ethanol annually per producer.³⁸⁶ There is an annual \$1.5 million cap per producer on the small ethanol producer's tax credit, and only producers with an annual production capacity of no more than sixty million gallons of ethanol per year are eligible to receive this credit.³⁸⁷ Like the blender's credit, the small ethanol producer's tax credit expired December 31, 2011, and Congress has yet to extend it.

There are also credits available for the production of biodiesel and renewable diesel used as fuel. The biodiesel and renewable diesel credits are found in § 40A. The biodiesel fuels credit for the taxable year is equal to the sum of the biodiesel mixture credit, plus the biodiesel credit and, in the case of small agri-biodiesel producers, the small agri-biodiesel producer credit.³⁸⁸ The biodiesel mixture credit allows for a credit of \$1 per gallon of biodiesel used in the production of a qualified biodiesel mixture.³⁸⁹ The biodiesel credit is \$1 per gallon of biodiesel produced that is not part of a mixture with diesel fuel.³⁹⁰ Renewable diesel receives the same \$1 per gallon credit that biodiesel receives.³⁹¹ Additionally, there is a small agri-biodiesel producer credit of \$0.10 per gallon up to fifteen million gallons for producers who produce less than sixty million gallons of biodiesel per year.³⁹² There is also an alternative fuels credit provided in § 6426(d). This credit allows for a fifty cent per gallon tax credit for alternative fuels such as liquefied petroleum gas, liquefied hydrogen, compressed or liquefied natural gas, and liquefied fuel derived from biomass as well as several other alternative fuels including P Series Fuels that do not qualify for the credits

385. *Id.*

386. Renewable Fuels Ass'n, *Federal Tax Incentives: Small Ethanol Producer Tax Credit*, ETHANOLRFA, <http://www.ethanolrfa.org/pages/federal-regulations-small-ethanol-producer-tax-credit> (last visited Feb. 22, 2012).

387. *Id.*

388. I.R.C. § 40A(a).

389. *Id.* § 40A(b)(1)(A).

390. *Id.* § 40A(2)(A).

391. *Id.* § 40A(f).

392. *Id.* § 40A(b)(4).

allowed for ethanol, alcohol, and biodiesel.³⁹³ This credit expired on December 31, 2009.³⁹⁴

Another tax credit for renewable fuels is the Cellulosic Biofuels Credit that was enacted with the 2008 Farm Bill. The 2008 Farm Bill provides \$1 billion in incentives to support the production of advanced cellulosic biofuels.³⁹⁵ Title XV of the Farm Bill tries to promote the production of cellulosic ethanol with a blender's credit of \$1.01 per gallon of ethanol produced from qualified cellulosic feed stocks.³⁹⁶ There is also an import tariff of \$0.54 per gallon of imported ethanol and imported ethanol cannot take advantage of the blender's tax credit.³⁹⁷

In addition to the tax credits for renewable fuels stated above, the Recovery Act also provided for the Manufacturing Tax Credit for investment in advanced energy property. Qualified facilities that are designed to refine or blend renewable fuels qualify for a 30% tax credit under this program.³⁹⁸ This legislation helped protect domestically produced ethanol and facilitate increased ethanol production.

The federal tax incentives for renewable fuels have directly aided in the development of the renewable fuels industry. However, like all other the federal tax credits for renewable energy, these incentives have either expired or are set to expire soon. Whether or not Congress renews them will have a serious effect on the future development of the renewable fuels industry. Unfortunately, these tax credit extensions have been subject to the broader partisan battles of the 111th Congress, and it is unlikely that major energy policy legislation will be enacted out of that Congress. Whether particular pieces of these tax incentives will be extended is not clear as of this writing. It remains to be seen how the 112th Congress will look at United States energy policy and whether a more comprehensive and broad-based energy policy will be forthcoming.

D. CHOOSING BETWEEN THE ITC, THE PTC, OR THE GRANT IN LIEU OF TAX CREDITS

The tax credit or grant that will best suit a producer depends largely on the producer's financial situation and what kind of energy-producing facility the producer wishes to construct. There are several factors project

393. *Id.* § 6426(d).

394. *Id.*

395. TOM CAPEHART, CONG. RESEARCH SERV., RL34130, RENEWABLE ENERGY POLICY IN THE 2008 FARM BILL 4 (2008).

396. *Id.*

397. *Id.*

398. I.R.C. § 48C(a), (c)(1)(B).

owners must consider when choosing between the PTC, ITC, or cash grant. First, they must consider the relative financial value of the tax incentives in comparison to each other.³⁹⁹ The relative value of a project will depend on installed project costs and expected capacity factor, or more simply put, production.⁴⁰⁰ It is important to note that solar technologies are not eligible for the PTC, but they can take the cash grant in lieu of the ITC.⁴⁰¹ In theory, the cash grant will provide the same value of incentive for the producer as the ITC, but there are other project finance considerations that may influence the producer in choosing either the ITC or the cash grant.⁴⁰²

A cash flow model is a way to help a producer choose between the PTC and the ITC when constructing a renewable energy facility that is qualified for both.⁴⁰³ With a cash flow model, the producer is able to see the present value of a PTC as it will be generated over ten years as well as the value of the ITC.⁴⁰⁴ The installed project cost and the expected capacity will vary depending on the type of energy producing property being put into service.⁴⁰⁵ The relative financial value of the PTC and the ITC is not always the most important factor in deciding which credit to take, as there are numerous qualitative considerations that may effect the producer's decision.⁴⁰⁶

The Recovery Act allows for certain PTC eligible properties to elect taking a 30% ITC.⁴⁰⁷ The Recovery Act also allows projects that are eligible for a 30% ITC to take a cash grant equal to the amount of the available ITC instead. The availability of tax equity investors, or lack thereof in the current economic climate, makes the ITC and the PTC less effective in the development of renewable energy.⁴⁰⁸ The cash grant helps lessen the dependence on these investors.⁴⁰⁹ With the cash grant, a project developer may be able to "access less-expensive debt or equity capital than might otherwise be available were the ITC or PTC used"⁴¹⁰

There are also reasons to take the ITC over the PTC. Underperformance of a project may make the PTC less attractive to

399. BOLINGER ET AL., *supra* note 340, at 4.

400. *Id.*

401. *Id.*

402. *Id.*

403. *See id.*

404. *Id.*

405. *See id.*

406. *Id.* at 10.

407. § 1102, 123 Stat. at 319-20.

408. BOLINGER ET AL., *supra* note 340, at 10.

409. *Id.*

410. *Id.* at 10-11.

investors, because even if on paper the PTC will provide a higher expected value, its value is not guaranteed.⁴¹¹ Therefore, the certainty of the ITC makes it more attractive than the PTC for some investors. Furthermore, because the PTC is a ten year credit, “a tax equity investor must be reasonably assured of having a tax base sufficient to fully absorb all of a project’s tax benefits over the coming decade.”⁴¹²

However, in certain situations, the liquidity of the PTC makes the PTC preferable to the ITC. The ITC and cash grants are realized at the beginning of the project and vest over a five year period; hence, the owner must keep the project for five years to realize the full benefit of the ITC.⁴¹³ As a result, the ITC and the cash grant will not be available to potential buyers.⁴¹⁴ The PTC runs over a ten year period, which allows the owner of the project to realize the credit and if the owner sells before the ten years is up, the PTC transfers and the new buyer can realize the remainder of the credit.⁴¹⁵

There are a few more reasons to select the ITC or the cash grant over the PTC. Subsidized energy financing is available for projects that are receiving the ITC or cash grant under the Recovery Act, but projects receiving the PTC are not eligible for such financing.⁴¹⁶ Also, there is a power sale requirement for PTC eligible projects, whereas there is not a power sale requirement with the ITC.⁴¹⁷ Finally, the PTC requires the project owner operate the project, which eliminates lease-financing options.⁴¹⁸ On the contrary, the ITC does not require the project owner to operate the project, and therefore, lease financing is an option with ITC eligible projects.⁴¹⁹

Based on the above analysis, there are advantages and disadvantages to the PTC, ITC, and cash grant. There is more flexibility with the ITC and the cash grant and less risk the full value of these incentives will not be realized. However, the PTC may realize more value in certain situations. Therefore, the project owner needs to fully evaluate the advantages and disadvantages of the tax credits in relation to the particular financial situation the project owner is in and the kind of energy project being

411. *Id.* at 11.

412. *Id.*

413. *Id.*

414. *Id.*

415. *Id.*

416. *Id.*

417. *Id.* at 12.

418. *Id.*

419. *Id.*

developed. By following these guidelines, investors will be able to choose which tax credit is best for their situation.

E. THE EFFECT OF THE AMERICAN RECOVERY AND REINVESTMENT ACT

The Recovery Act has been cited extensively in the previous sections dealing with the investment tax credit, production tax credit, grant in lieu of tax credits, and renewable fuels tax credits because virtually all of these tax credits were amended, modified, or extended by the Recovery Act. This subsection discusses some of the most important changes that were brought about by the Recovery Act in relation to these tax credits.

The Recovery Act extended the deadline to place projects in service for purposes of receiving a PTC. The PTC was extended through 2012 for wind energy and “through 2013 for closed-[loop] and open-loop biomass, geothermal, landfill gas, municipal solid waste, qualified hydroelectric, and marine and hydrokinetic facilities.”⁴²⁰ The Recovery Act also allows producers to choose the ITC instead of the PTC.⁴²¹ Under section 1102 of the Recovery Act, energy producers that place facilities in service to produce electricity from wind or certain other renewable energy sources after December 31, 2008, will have the option to choose either the ITC, which allows for a 30% tax credit, or the PTC which gives a tax credit of up to \$0.021 per kilowatt-hour for electricity that is produced from qualified sources.⁴²²

The Recovery Act provided the option for renewable energy producers to choose a cash grant in lieu of the ITC. This program, as stated above, is under the control of the Treasury and will provide grants of up to 30% of the basis of qualified renewable energy facilities placed in service in 2009 to 2011.⁴²³ Also, projects that begin construction in 2009, 2010, or 2011 will be eligible for the grant so long as they are placed in service by 2013 for wind energy, by 2017 for solar energy, and by 2014 for other qualified energy sources.⁴²⁴ The due date for applications was October 1, 2011, and payments will be made either sixty days after the application was received or from when the project is placed in service, whichever date is later.

Section 1103 of the Recovery Act also repealed the \$4000 cap on the 30% ITC for small wind energy.⁴²⁵ The repeal in section 1103 applies to

420. *Id.* at 3.

421. *Id.*

422. *Energy Incentives for Businesses, supra* note 338.

423. BOLINGER ET AL., *supra* note 340, at 3.

424. *Id.*

425. *Energy Incentives for Businesses, supra* note 338.

properties placed in service after December 31, 2008.⁴²⁶ The removal of the cap is an important step for small wind energy producers. Lastly, the Recovery Act provides great support for renewable energy. High start-up costs combined with the downturn in the economy make tax incentives imperative to the development of the renewable energy economy. The extensions to the ITC and PTC, as well as the creation of the cash grant in lieu of tax credits, will facilitate the growth of the renewable energy sector in years to come.

F. THE FUTURE OF FEDERAL TAX INCENTIVES FOR CLEAN ENERGY

Currently, the PTC, ITC, grant in lieu of tax credits, MTC, and several other tax credits for renewable fuels are effectively expanding the renewable energy industry in America. The current status of each of these tax incentives, as well as what extensions are needed for these tax credits to be effective, are discussed below.

The PTC is currently extended through the end of 2012 for wind energy and through the end of 2013 for other types of energy.⁴²⁷ The ITC is currently extended through December 31, 2016, for certain renewable energy projects.⁴²⁸ The cash grant in lieu of the ITC is available for certain wind projects placed in service before 2013, certain solar projects placed in service before 2017, and certain other qualified energy projects placed in service before 2014.⁴²⁹ Applications for the MTC were due October 16, 2009, and awardees of the MTC received their acceptance agreements with the IRS on or before April 16, 2010, on the condition that projects must be commissioned before February 17, 2013.⁴³⁰ The cap on the MTC is \$2.3 billion, and all credits have been awarded.⁴³¹ It is important to note the MTC “was oversubscribed by a ratio of more than [three] to [one].”⁴³² The renewable fuels blender’s credit and the small ethanol producer credit are both set to expire on December 31, 2011.⁴³³

The problem with all of the federal tax incentives for renewable energy is that they expire every couple of years and the funding, or caps on the

426. *Id.*

427. I.R.C. § 45(d) (Supp. 2010).

428. *Id.* § 48.

429. BOLINGER ET AL., *supra* note 340, at 3.

430. *Fact Sheet: \$2.3 Billion in New Clean Energy Manufacturing Tax Credits*, THE WHITE HOUSE (Jan. 8, 2010), <http://www.whitehouse.gov/the-press-office/fact-sheet-23-billion-new-clean-energy-manufacturing-tax-credits> [hereinafter *Fact Sheet*].

431. *Id.*

432. *Id.*

433. *Federal Tax Incentives: VEETC*, *supra* note 377; see also *Federal Tax Incentives: Small Ethanol Producer Tax Credit*, *supra* note 386.

available credits, is never high enough to meet the demand. For example, the MTC is a good credit to help start the manufacturing of renewable energy products in the United States. The MTC is estimated to create 17,000 jobs and be matched by \$5.4 billion in private sector funding that will support as many as 41,000 jobs.⁴³⁴ However, the \$2.3 billion in MTCs available was oversubscribed.⁴³⁵ Clearly, there was interest in investing in renewable energy product manufacturing that far exceeded the available funding for MTCs.

The two most important renewable fuels credits, the blenders credit and the small ethanol producer tax credit, expired on December 31, 2011. The Renewable Fuels Association (RFA) stated, in regard to the blender's credit, "[the] VEETC has been a major factor behind the spectacular increase in ethanol use, production and continued innovation in the industry."⁴³⁶ Also, the small ethanol producer tax credit is very important to the ethanol industry and the RFA is fighting to make sure this credit does not expire on December 31, 2011. Without these tax credits, the renewable fuels industry would suffer serious economic setbacks.

Additionally, the grant in lieu of tax credits is important to renewable energy projects because most renewable energy developers have traditionally relied on tax equity financing, which is hard to secure in today's economic climate.⁴³⁷ This problem is likely to persist until the economy recovers from Wall Street's collapse.⁴³⁸

With regard to the PTC, it is critical to the development of renewable energy, especially to wind energy. In 2008, just before the passage of the Recovery Act, the American Wind Energy Association (AWEA) released a report stating the problems with the PTC and what is required to fix those problems. They stated, "we seek changes that would foster efficient use of all tax incentives by making the credit and depreciation benefit refundable and by increasing flexibility to allow the credit to be utilized to offset tax liabilities from the prior decade."⁴³⁹ The main problem faced by the industry is the instability caused by the repeated expiration of the PTC, which has been allowed to expire in 1999, 2001, and 2003,⁴⁴⁰ making investors reluctant to finance wind projects. AWEA stated, "[a]s a result of

434. *Fact Sheet*, *supra* note 430.

435. *Id.*

436. *Federal Tax Incentives: VEETC*, *supra* note 377.

437. *1603 Treasury Grant Program*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/solar_policies_1603_treasury_program (last visited Feb. 22, 2012).

438. *Id.*

439. AM. WIND ENERGY ASS'N, *supra* note 333, at 8.

440. *Id.*

this on-again, off-again pattern, the wind power industry has been denied the certainty needed to make long-term investments in wind power manufacturing and development.”⁴⁴¹ AWEA sought a five year extension of the PTC in 2008.⁴⁴² The Recovery Act helped somewhat by extending the PTC through 2012 and granting an option to take the ITC or a grant in lieu of the ITC.⁴⁴³ However, the extension is not long enough, as it will expire again at the end of 2012 without further legislative action.

The ITC is currently extended through December 31, 2016 by the Emergency Economic Stabilization Act of 2008.⁴⁴⁴ The ITC is the only tax credit to be extended for eight years. The long-term extension of the ITC is crucial to investment in eligible technologies, especially the solar industry. According to the Solar Energy Industries Association (SEIA), “[t]he [eight]-year extension of the ITC will provide the market ‘demand-signal’ that is needed for the industry to build new manufacturing capacity, expand the installer work force and construct new utility-scale solar power plants.”⁴⁴⁵ The effects of the ITC now and in the future are a perfect example of how important these credits are to the development of renewable energy. Extension of these credits for longer periods will lead to accelerated economic growth in the renewable energy industry.

While extending these renewable energy tax credits receives bipartisan support on Capitol Hill, they are subject to criticism as choosing favorites among energy resources. A recent Congressional Research Service study has concluded that renewable tax incentives receive a much larger share of tax incentives than fossil resources as compared to their respective contributions to overall energy produced in the United States.⁴⁴⁶

G. CURRENT LEGISLATION REGARDING FEDERAL TAX INCENTIVES

There are bills in Congress before the House and the Senate dealing with the various issues discussed above. Although there is currently no legislation to extend the ITC beyond 2016 in Congress, there is currently legislation in the House and Senate to amend § 48 to allow an ITC for property that is used to fabricate solar energy property.⁴⁴⁷ The amendment

441. *Id.*

442. *Id.*

443. *Legislative Affairs: American Recovery and Reinvestment Act Provides Measures to Sustain and Expand Wind Energy Industry Growth*, AM. WIND ENERGY ASS'N, <http://achive.awea.org/legislative/> (last visited Feb. 22, 2012).

444. *Solar Energy Indus.*, GREEN PROFILE, 1, <http://greenjobs.workforce3one.org/view/2001022551212643721> (last visited Oct. 6, 2012).

445. *Id.*

446. Sherlock, *supra* note 308, at 9.

447. H.R. 4085, 111th Cong. § 1 (2009).

would also make the property eligible for Recovery Act section 1603 grants in lieu of tax credits.⁴⁴⁸ The legislation would help facilitate solar manufacturing in the United States and create jobs for Americans. There is also legislation to extend the PTC. The bill is House Bill 435, the Renewable Energy Production Tax Credit Extension Act of 2009. House Bill 435 is a bill to amend § 45(d) to extend the PTC five years to 2017.⁴⁴⁹ An extension of the PTC would be very beneficial to the wind industry and would promote future investment in that area.

Furthermore, there is currently legislation in Congress looking to extend the Treasury Grant Program (TGP), commonly referred to as the grant in lieu of tax credits, by amending section 1603. House Bill 5252, or the Renewable Energy Tax Incentives Extension Act, looks to extend the TGP through 2012.⁴⁵⁰ This legislation is strongly supported by the SEIA because the TGP eliminates the need for tax equity financing and is vital to furthering the development of solar power until the economy recovers.⁴⁵¹

Senate Bill 2899, the Renewable Energy Incentive Act, addresses amending the Recovery Act. Senate Bill 2899 looks to extend the TGP through 2012, as well as expand grants for specified energy property.⁴⁵² Under the proposed amendments, qualified solar manufacturing project property would be eligible for a grant in lieu of tax credits.⁴⁵³ The TGP is important, as stated above, because it eliminates the need for equity investors. The amount of legislation trying to extend the TGP is evidence that the industry is still not receiving enough private sector investment.

There is also a push from the SEIA to increase the amount of money available for the MTC for solar equipment. SEIA has made a statement in support of the Solar Manufacturing Jobs Creation Act, saying it “supports the Administration’s proposed \$5 billion in additional funding for the [§] 48C program.”⁴⁵⁴ SEIA recognizes that the original \$2.3 billion cap on the MTC is exhausted and argues that increasing MTC funding would create nearly 160,000 domestic jobs by 2016.⁴⁵⁵ For these reasons, SEIA strongly supports an extension of the § 48C program as well as additional funding for the MTC.⁴⁵⁶

448. *Id.* § 2.

449. H.R. 435, 111th Cong. § 2 (2009).

450. H.R. 5252, 111th Cong. § 2 (2010).

451. *1603 Treasury Grant Program*, *supra* note 437.

452. S. 2899, 111th Cong. § 1 (2009).

453. *Id.* § 4.

454. *Solar Manufacturing Jobs Creation Act*, SOLAR ENERGY INDUS. ASS’N, 1 (2010), http://www.seia.org/galleries/pdf/MITC_09%2017%2010.pdf.

455. *Id.*

456. *Id.*

There are also a number of bills dealing with extension of renewable fuels tax credits. Senate Bill 3231 looks to extend the income tax credit and the excise tax credit for alcohol used as fuel through January 1, 2016.⁴⁵⁷ Senate Bill 3338 Advanced Biofuel Investment Act intends to amend § 48 to allow an ITC of 30% on qualified advanced biofuel production property.⁴⁵⁸ Senate Bill 3338 would amend section 1603 to make qualified advanced biofuel production property eligible for the grant in lieu of the ITC.⁴⁵⁹ Finally, House Bill 4940, the Renewable Fuels Reinvestment Act, if passed will add a five year extension to the small ethanol producer tax credit and the VEETC, or blenders credit, as well as extending the Cellulosic Biofuel Producer Tax Credit through December 31, 2015.⁴⁶⁰ The RFA is currently working to get companion legislation introduced to extend the VEETC as well as other renewable fuel tax incentives.⁴⁶¹

Not all legislation is in favor of renewable fuels tax credits. House Bill 3187, the Affordable Food and Fuel for America Act, is very much against the extension of tax credits for renewable fuels. House Bill 3187 would reduce and eliminate tax credits for alcohol used as fuels as well as do away with the tariffs on imported ethanol.⁴⁶² Bills such as this do not come as a surprise given the lively debate over the viability of ethanol and the effects its use as fuel has on food prices.

IV. CONCLUSION

The default of Solyndra, rightfully or wrongly, has soured the mood in Congress to move forward with extending existing tax incentives, or authorizing new federal programs to incentivize clean energy. This may be a shortsighted, given the boost the Recovery Act has provided for alternative energy infrastructure in the United States. It is unclear whether the momentum created by the Recovery Act can be sustained without these technologies being given parity with traditional technologies by incentivizing their positive externalities to American energy independence and environmental benefits. Abandoning this momentum could result in the lack of needed infrastructure in the decades ahead when domestic energy supply again becomes a critical vulnerability. The amount of legislation currently in Congress with the aim of extending tax credits for renewable energy is evidence of the importance of these tax credits to the renewable

457. S. 3231, 111th Cong. §§ 2-3 (2010).

458. S. 3338, 111th Cong. § 2 (2010).

459. *Id.*

460. H.R. 4940, 111th Cong. §§ 1-2 (2010).

461. *Federal Tax Incentives: Small Ethanol Producer Tax Credit*, *supra* note 386.

462. H.R. 3187, 111th Cong. §§ 3-4 (2009).

energy industry. Without the extension of these tax credits, the renewable energy industries and de-funding many of the non-tax federal incentive programs discussed in this Article will impede the growth of an robust American clean energy sector, resulting in loss of potential jobs and needed infrastructure. Therefore, passage of the legislation extending tax credits for renewable energy would be a signal that the federal government still intends to be a catalyst for this home-grown clean technology industry and help insure a more speedy economic recovery and the future health and well-being of the American energy sector.

The high start-up costs of renewable energy producing facilities combined with the current economic downturn make the extension of federal tax credit programs vital to the future development of the renewable energy industry. By extending these tax credits and grant programs, the renewable energy sector will develop much faster than it would without them. The extension will create jobs, fight climate change, and give America greater energy independence. For these reasons, federal tax incentives for renewable energy need to be extended.