



Spring 2012

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Recommended Citation

Ivan Lieben & Ian Boisvert, *Making Renewable Energy FiT: A Feed-in-Tariff Certifying Body Could Accelerate Renewable Energy Deployment in the United States*, 52 Nat. Resources J. 157 (2012). Available at: <https://digitalrepository.unm.edu/nrj/vol52/iss1/6>

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Making Renewable Energy FiT: A Feed-in-Tariff Certifying Body Could Accelerate Renewable Energy Deployment in the United States

ABSTRACT

Now is the time for the United States to accelerate its deployment of renewable energy (RE). Feed-in-Tariffs (FiTs) provide the best vehicle for achieving this important goal. FiTs are government-mandated, long-term purchase contracts offered to RE generators at wholesale rates that return to them the cost of installation plus a reasonable profit. Germany has the world's highest amount of installed solar power due to its implementation of FiTs. To spur proper implementation of FiTs in the United States, we recommend the creation of a FiT Certification Board (FCB) to certify that state and local FiT programs meet minimum, necessary elements for effective FiTs. Of all competing policies at promoting RE development, FiTs provide the best and most efficient mechanism. However, unlike in Germany, Spain, and many other countries, FiTs are not widely established in the United States notwithstanding a strong desire to promote RE domestically. Where states have tried something like FiTs, the results have been discouraging because their FiTs lack the necessary components to make them effective. In addition, federal laws, such as the Public Utility Regulatory Policies Act and the Federal Powers Act, along with the varied nature of energy markets in the United States, create additional barriers to widespread FiT adoption. We believe that the creation and functioning of the FCB will

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The authors would like to thank Mr. Paul Gipe, noted expert, author, and blogger on Feed-in-Tariffs, and the founder of Wind Works.org (<http://wind-works.org/>), for his review and thoughtful comments on the article. The authors would also like to thank Susan Gilbert-Miller, a recent graduate of the University of San Francisco School of Law, for her professional and helpful work at cite checking the article.

help to overcome these barriers. The FCB can work collaboratively with governments to craft optimal FiT laws and programs which are consistent with federal law. The FCB would then certify that those laws or programs meet RE deployment goals. To determine the minimum elements and necessary components to guide certification, we draw from European and other international experiences. We believe that the FCB could help unleash RE in the United States on unprecedented levels.

I. INTRODUCTION

U.S. policymakers have had limited success in creating Feed-in-Tariff (FiT) programs that truly spur renewable energy (RE) development. We believe that the United States would have greater success with FiTs and deploying RE if it were to create a FiT Certification Board (FCB). This introduction provides a brief background on the current state of electricity production and FiTs in the United States. Part II examines two certifying organizations that prove useful as examples of how the FCB might operate and perform its certifications, and includes our recommendations for the structure and function of the FCB. Part III surveys some FiT programs that have successfully led to RE deployment, as well as those FiT programs that have failed to produce much RE. From these programs, we identify the core principles of a successful FiT that the FCB should establish as criteria to evaluate future FiT programs. Part IV contains our conclusion that establishing an FCB would greatly improve the United States' ability to implement successful FiT programs to make RE more competitive.

A. Current State of Electricity Production and Distribution in the United States

Electricity powers our complex and increasingly mechanized and urbanized lifestyle.¹ Electrical power comprises the flow of charge, in the form of electrons, to power the machines of humanity, and results from the conversion of primary energy sources, historically coal, natural gas, petroleum, or nuclear power.² More recently, renewable resources—including wind, solar, and even wave power—have become additional

1. See generally *Electricity 101: Frequently Asked Questions*, OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, DEPT. OF ENERGY (DOE), <http://energy.gov/oe/information-center/educational-resources/electricity-101> (last visited Nov. 20, 2011)(explaining the basic principles of electricity).

2. *Id.* See also U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY REVIEW 2009, 9 (2010), available at <http://www.eia.gov/FTPROOT/multifuel/038409.pdf>.

sources of electrical energy.³ Electricity generators sell their power to retail utilities, who deliver that electricity through varied and numerous transmission lines, called the “grid,” to the energy consumers or ratepayers.⁴ Electricity flows through the grid from high to low voltage areas, i.e., from the power generators to the consumers or electricity users.⁵ Voltage must also be adjusted from high voltage transmission to the lower voltage provided to end power users.⁶

It is an exacting task to match electricity production with its use, given the variety of generators and transmission lines in the United States.⁷ Since there is no adequate long-term storage system, electricity supply must be matched to demand at any given time.⁸ For instance, a household’s electricity use will vary depending upon the time of year and the time of day.⁹ Electricity usage typically peaks during the summer months in the afternoons, when air conditioners are functioning at their maximum.¹⁰ This demand must be matched to energy production.

3. *Electricity Explained: Electricity in the United States*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states (last visited Nov. 20, 2011).

4. *Overview of the Electric Grid*, OFFICE OF ELEC. DELIVERY AND ENERGY RELIABILITY, DOE, <http://nomoretowers.org/Documents/GridWorks%20Overview%20of%20the%20Electric%20Grid.htm> (last visited Nov. 7, 2011) (describing how there are more than 10,000 fossil fuel-based power plants in the United States). It used to be that utilities owned the transmission lines, and had exclusive use of them. However, in 1996, through its Final Rule 888, the Federal Energy Regulatory Commission (FERC) required that utilities open access in their transmission lines to allow for competition on the retail side, essentially splitting apart generation from retail services. MOHAMMAD SHAHIDEHPOUR & MUWAFFAQ ALMOUSH, *RESTRUCTURED ELECTRICAL POWER SYSTEMS: OPERATION, TRADING, AND VOLATILITY* 3 (2001).

5. NEW YORK STATE ENERGY RESEARCH & DEV. AUTH., *POWER GRID & ELECTRICITY DELIVERY: OVERVIEW*, POWER NATURALLY 4–5 (Oct. 2005), available at http://www.powernaturally.org/programs/wind/toolkit/8_overviewpowergrid.pdf. In the United States, electricity is transmitted as alternating current rather than direct current. Alternating current, at the time that it became the grid protocol, had the advantage of being able to be converted, by transformers, to higher voltages, thereby allowing for the transmittal of electricity over longer distances with less power loss. IEEE GLOBAL HISTORY NETWORK, *IEEE, AC vs. DC: THE STRUGGLE FOR POWER*, http://www.ieeeahn.org/wiki/index.php/AC_vs_DC (last visited July 21, 2011).

6. STAN MARK KAPLAN, CONG. RESEARCH SERV., R40511, *ELECTRICAL POWER TRANSMISSION: BACKGROUND AND POLICY ISSUES* 2 (2009).

7. See generally ARTHUR MAZER, *ELECTRIC POWER PLANNING FOR REGULATED AND DEREGULATED MARKETS* (2007) (for an explanation of how electricity production is matched to its usage given the variety of transmission lines in the United States).

8. *Electricity Transmission Fact Sheet*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/cneaf/electricity/page/fact_sheets/transmission.html (last visited Nov. 7, 2011).

9. OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, *supra* note 1.

10. OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, *supra* note 1.

When the grid was first put into place in the 1880s, there were few producers and they only served limited users.¹¹ Now, the transmission lines link together many producers and users, bringing increased reliability and redundancy to the electrical system. Currently, investor-owned utilities own over 50 percent of electricity generation and over 80 percent of the transmission lines.¹² Public-owned utilities and cooperatives account for about 25 percent of electricity generation and most of the rest of the transmission lines.¹³ Independent power producers make up the final 25 percent of electricity generation.¹⁴

The grid's historic reliance upon conventional sources of electricity, such as fossil fuels,¹⁵ has resulted in many adverse impacts, including high levels of greenhouse gas (GHG) emissions. Producing electricity from fossil fuels releases the GHG carbon dioxide, along with other pollutants, such as particulate matter, that adversely impact human health.¹⁶ As of 2005, the burning of fossil fuels for energy accounted for about 60 percent of GHG emissions.¹⁷ Moreover, GHGs are likely warming the planet and changing world weather patterns. According to the Intergovernmental Panel on Climate Change, the principle international organization established to study and opine on global warming issues,¹⁸

11. Matthew H. Brown & Richard P. Sedano, Nat'l Council on Electric Policy, *Electricity Transmission: A Primer 2* (2004), available at <http://www.puc.nh.gov/Transmission%20Commission/Transmission%20Infrastructure/Appendix%20A.pdf>.

12. OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, *supra* note 1.

13. OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, *supra* note 1.

14. OFFICE OF ELEC. DELIVERY & ENERGY RELIABILITY, *supra* note 1.

15. See *Total Energy*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/totalenergy> (last visited Nov. 7, 2011) (reporting that for 2009, the breakdown for 2009 energy production in the United States was: petroleum 37%, natural gas 25%, coal 21%, nuclear 9%, and RE 8%).

16. Anil Markandya & Paul Wilkinson, *Electricity Generation and Health*, 370 THE LANCET 979, 979-990 (2007). The authors note that "[c]omparison of different forms of commercial power generation by use of the fuel cycle methods developed in European studies shows the health burdens to be greatest for power stations that most pollute outdoor air (those based on lignite, coal, and oil *Id.* at 979).

17. See KEVIN A. BAUMERT, TIMOTHY HERZOG, & JONATHAN PERSHING, WORLD RESOURCES INST., *NAVIGATING THE NUMBERS: GREENHOUSE GAS DATA AND INTERNATIONAL CLIMATE POLICY 4* (2005) available at http://pdf.wri.org/navigating_numbers.pdf.

18. See LENNY BERNSTEIN ET AL., *CLIMATE CHANGE 2007: SYNTHESIS REPORT iii* (Rajendra K. Pachauri et al. eds., 2007) available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_frontmatter.pdf. The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme (UNEP) to investigate the science pertaining to climate change, evaluate the impacts of climate change, and brainstorm response strategies. The IPCC has issued four assessment reports regarding global warming in 1990, 1995, 2001 and 2007, available at http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm (last visited Nov. 10, 2011). The effort has involved over 500 renowned scientists from throughout the world, and over 2,000 expert reviewers provided input on the final report.

“[m]ost of the observed increase in global average temperatures since the mid-twentieth century is very *likely* due to the observed increase in anthropogenic GHG concentrations.”¹⁹ Now is the time to break our dependence on fossil fuel-based electricity by adopting RE on a wide scale in the United States and elsewhere. Other nations, especially in Europe, are leading RE deployment, mostly through the use of effective FiT programs. The United States can follow their lead through the promotion of effective FiTs with the assistance of an FCB.

B. Feed-in-Tariffs Deploy Renewable Energy

1. What Is a “Feed-in-Tariff”?

A FiT is an energy supply policy which mandates that utilities enter into long-term, fixed-price contracts with RE generators to purchase their electricity ahead of fossil-fuel generated electricity.²⁰ Specifically, FiTs are a per kilowatt hour payment for electricity produced by renewable power with the payment amount differing depending on the generating technology, and the size and geographical location of the technology.²¹ The goal of the FiT is to encourage deployment of renewable power technology by making production of electricity from these sources competitive with conventionally fueled electricity.²²

FiTs are not taxes or tariffs as commonly understood in the United States.²³ Rather, FiTs are best understood as a consumer funded subsidy for RE. FiTs work by requiring utilities or wholesale purchasers of electricity to purchase RE generated power from wind turbine operators, for example, at rates set by the government. The utilities then pass the costs on to the consumers.²⁴ Thus, in the end, FiTs succeed in increasing RE generation because the government-set price encourages production and use while the costs are passed on to the consumer.

19. *Id.* at 3, available at http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.

20. See TOBY D. COUTURE ET AL., NAT’L RENEWABLE ENERGY LAB, A POLICYMAKER’S GUIDE TO FEED-IN TARIFF POLICY DESIGN 6 (2010), available at <http://www.nrel.gov/docs/fy10osti/44849.pdf>.

21. Nancy LaPlaca, FEED-IN TARIFFS: A MECHANISM, NOT A GOAL 2 (June 2009), available at <http://www.wind-works.org/FeedLaws/PrimersonFeed-inTariffsandAdvancedRenewableTariffs.html> (last visited Feb. 26, 2012).

22. See generally COUTURE ET AL., *supra* note 20, at 84, 92.

23. The word “tariff” comes from a literal translation of the German word *Stromeinspeisungsgesetz*, because Germany was one of the first countries to implement FiTs. Paul Gipe, *Evolution of Feed-in Tariffs*, WIND-WORKS.ORG (Oct. 6, 2010), <http://www.wind-works.org/FeedLaws/EvolutionofFeed-inTariffs.html> (last visited Feb. 26, 2012).

24. *Fed up: Germany’s Support for Solar Power Is Becoming Ever Harder to Afford*, ECONOMIST [US] 59 Jan. 9, 2010, available at <http://www.economist.com/node/15213817>.

Of all policies targeted to increase renewable power production, FiTs result in the highest amount of installed RE capacity.²⁵ FiTs are successful because they are market mechanisms that directly reward RE production.²⁶ FiTs allow wholesale prices to be set to promote the targeted renewable technology for a specific geographic location.²⁷ The prices are typically reduced over the life of the program to encourage early investment and deployment.²⁸

The best examples of FiTs come from outside the United States. For example, Germany's FiT laws show that FiTs can be effective policies to rapidly deploy RE.²⁹ Even though Germany is not known for a sunny climate, in 2009 it installed 3,800 megawatts of solar photovoltaic electricity capacity.³⁰ In stark contrast sunny California installed only 250 megawatts of solar photovoltaic.³¹ The unlikely discrepancy is the result of Germany's FiT law called *Stromeinspeisungsgesetz*.³² We will examine several FiT programs in more detail in Part III.

While FiTs can raise costs for the consumers who end up paying the bill,³³ policymakers can reduce this financial impact by properly pricing the costs of RE electricity when designing FiTs. Moreover, evidence suggests FiTs have lower costs for consumers than other RE policies, such as setting a minimum quota of RE within a utility's overall electricity portfolio—sometimes called a Renewable Portfolio Standard.³⁴ For in-

25. See generally RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY (REN21), RENEWABLES 2010 GLOBAL STATUS REPORT 37 (2010), available at http://www.ren21.net/Portals/97/documents/GSR/REN21_GSR_2010_full_revised%20Sept201.pdf (by early 2010, at least 50 countries had adopted feed-in tariffs which spurred innovation and increased investment in RE). See also MIGUEL MENDONÇA, WORLD FUTURE COUNCIL, FEED-IN TARIFFS: ACCELERATING THE DEPLOYMENT OF RENEWABLE ENERGY xiv (2007) ("The most successful policy instrument yet devised for speeding the comparatively low-cost deployment of renewable energy technologies is the feed-in tariff (FIT) model.").

26. See generally LaPlaca *supra* note 21.

27. See generally COUTURE ET AL., *supra* note 20 at v.

28. See generally COUTURE ET AL., *supra* note 20 at xi.

29. See generally COUTURE ET AL., *supra* note 20 at 6.

30. Paul Gipe, *Germany to Raise Solar Target for 2010 and to Adjust PV Tariffs*, WIND-WORKS.ORG (June 1, 2010), <http://www.wind-works.org/FeedLaws/Germany/GermanytoRaiseSolarTargetfor2010andtoAdjustPVTariffs.html> (last visited Feb. 26, 2012).

31. See *id.*

32. Paul Gipe, *The Original Electricity Feed Law in Germany*, WIND-WORKS.ORG, <http://www.wind-works.org/FeedLaws/Germany/ARTsDE.html> (last visited Dec. 28, 2010).

33. See generally Alex Morales, *Fossil Fuel Subsidies Are 12 Times Support for Renewables, Study Shows*, BLOOMBERG (July 29, 2010, 9:59 A.M. PT) <http://www.bloomberg.com/news/2010-07-29/fossil-fuel-subsidies-are-12-times-support-for-renewables-study-shows.html> (discussing that in 2009, ratepayers under Germany's FiT's program paid \$9.6 billion, the largest single financial support of RE energy deployment in the world that year).

34. See COMM'N OF THE EUROPEAN COMMUNITIES, COMMISSION STAFF WORKING DOCUMENT: THE SUPPORT OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES, 8 (2008), available at

stance, FiTs tend to encourage distributed generation (i.e., small generators) that are close to urban centers, hence limiting the need for expensive upgrades to the transmission infrastructure.³⁵ Distributed generation could result in lower overall costs because small renewable generators can be in urban areas, which means the generator can connect and deliver to existing electricity lines.³⁶ In contrast, building large-scale generators in remote areas, like deserts, often requires building major transmission lines to carry the electricity long distances.³⁷

The additional costs to consumers are outweighed by four important benefits to developing RE capacity through FiTs.³⁸ First, fossil fuels, the main sources of electricity today, cause air pollution—including emissions of fine particulates, nitrogen dioxide, sulfur dioxide, and carbon dioxide—that contributes to public health impacts, and to climate change and its concomitant effects.³⁹ Successful FiTs aid in avoiding

http://ec.europa.eu/energy/climate_actions/doc/2008_res_working_document_en.pdf (discussing how FiTs are more efficient and effective than other forms of RE development in Europe). See also *Challenges of Electric Power Industry Restructuring for Fuel Suppliers*, U.S. ENERGY INFO. ADMIN., DOE, 73 (Sept. 1998), available at http://www.eia.gov/pub/electricity/chg_str_fuel.pdf.

35. Symposium, *21st Century Infrastructure: Opportunities and Hurdles for Renewable Energy Development*, 10 SUSTAINABLE DEV. L. & POL'Y 69, 72 (2009) (arguing that “[l]arge-scale renewable generation will require a grid overhaul” and that these will need to be dealt with through regional-level planning); Nora Mead Brownell & Kristine M. Schmidt, *Capping Carbon Without Reinventing the Wheel*, 18 N.Y.U. ENVTL. L.J. 36, 38-40 (2010) (predicting the cost to upgrade transmission and distribution capacity in the United States to be \$900 billion by 2030).

36. See, e.g., J.A. Peças Lopes et al., *Integrating Distributed Generation into Electric Power Systems: A Review of Drivers, Challenges and Opportunities*, 77 ELECTRIC POWER SYSTEMS RESEARCH 9, 1189-1203, at 1195 (2007) available at <http://www.sciencedirect.com/science/article/pii/S0378779606001908>. See also S.W. Hadley et al., *Quantitative Assessment Of Distributed Energy Resource Benefits* 28 (May 2003), available at <http://www.tnmp.ornl.gov/sci/ees/etsd/pes/pubs/116227.pdf>.

37. THE U.S. ENERGY INFO. ADMIN., *supra* note 34, at 81. See also COUTURE ET AL., *supra* note 20, at 28.

38. We propose that political entities creating FiTs—especially highly effective ones that result in greater increases of utility rates given the higher RE deployment—establish funds to assist families of lower socioeconomic classes to pay for the increased utility rates. This should address equity concerns in a cost-effective manner while still allowing FiTs to be fully implemented.

39. See, e.g., STEPHEN J. JAY, M.D., THE PUBLIC HEALTH IMPACT OF A RENEWABLE ELECTRICITY STANDARD (RES) IN INDIANA 3 (Sept. 26, 2006), available at <http://www.citact.org/dukeigcc/pdfs/ThePublicHealthImpactofaRESinIndiana.pdf> (describing how “[i]n 2004, power plants were responsible for roughly two-thirds of sulfate emissions, about 40 percent of carbon dioxide emissions, and 22 percent of nitrogen oxides. Because of their small size, fine particles can be inhaled deeply into the lungs, and may enter the bloodstream. There is broad scientific consensus that fine particle pollution endangers our health. These health effects range in severity from minor symptoms to chronic, serious and fatal out-

these negative effects associated with fossil fuel-based electricity because they offset the need for fossil-fuel generated electricity and its associated pollution.⁴⁰

Second, the Energy Information Administration estimates electricity demand rising 3 percent per year over the next 25 years.⁴¹ With this rise in demand comes the need for more supply. Electricity generated from energy sources like wind, sun, and water can help meet demand growth while displacing or replacing polluting fossil-fuel based electricity.

Third, FiTs could help stabilize energy markets and protect electricity grids from disruption by encouraging more distributed generation, which reduces reliance on large centralized electricity generators.⁴² Typically, electricity is distributed from remote, large power-producing plants that send the electrons over long distances to the areas which consume the electrons.⁴³ Distributed generation, on the other hand, usually uses small-scale renewable power to generate electricity close to the site

comes.”); *see also* THE CLEAN AIR TASK FORCE, *THE TOLL FROM COAL* (Sept. 2010), available at http://www.catf.us/resources/publications/files/The_Toll_from_Coal.pdf (estimating the number of deaths nationally associated with fine particulate, sulfur dioxide and nitrogen oxide emissions from coal-fired power plants). The Clean Air Task Force commissioned Abt Associates to estimate the health impacts from existing coal plants using methodologies “approved by both the U.S. Environmental Protection Agency’s (EPA) Science Advisory Board and the National Academy of Sciences (NAS).” *Id.* at 4. That analysis predicted that fine particle pollution from existing coal plants was expected to cause nearly 13,200 deaths in 2010. *Id.*

40. *See, e.g.*, Shruti Khadka Mishra, *Estimation of Externality Costs of Electricity Generation from Coal: An OH-MARKAL Extension* (2009) (unpublished Ph.D. dissertation, Ohio State University) (on file with, Ohio State University Library), available at <http://etd.ohiolink.edu/send-pdf.cgi/Khadka%20Mishra%20Shruti.pdf?osu1259703337> (discussing and reviewing studies on externalities from coal power plants and mining operations).

41. *International Energy Outlook*, U.S. ENERGY INFO. ADMIN., 4, Sept. 2011, available at <http://www.eia.doe.gov/oiaf/ieo/pdf/highlights.pdf> (explaining that total net electricity generation in non-OECD countries increases by an average of 3.3 percent per year whereas OECD countries grow by 1.2 percent annually); *see also* Diana Farrell, Scott S. Nyquist, and Matthew C. Rogers, *Making the Most of the World’s Energy Resources*, MCKINSEY Q. at 31, Feb. 2007, available at http://www.mckinseyquarterly.com/Making_the_most_of_the_worlds_energy_resources_1904 (last visited Feb. 26, 2012).

42. Kristin Bluvas, *Distributed Generation: A Step Forward in United States Energy Policy*, 70 ALB. L. REV. 1589, 1590 (2007) (arguing that distributed generation should “supplement and stabilize our current grid” and allow more widespread use of renewable sources).

43. *Electricity Is Delivered to Consumers Through a Complex Network*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energyexplained/index.cfm?page=electricity_delivery (last visited Nov. 20, 2011). The Energy Information Administration also publishes maps for each of the 50 states’ energy production, which include major electricity transmission lines and power plants. *See, e.g.*, Map of California, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/state/state-energy-profiles.cfm?sid=ca> (last visited Nov. 20, 2011).

where it will be consumed, and any excess power can be returned to the grid.⁴⁴ Evidence suggests that the adverse impacts of the grid failures that caused the 2003 energy blackout on the East Coast and the 2001 energy crisis in California might have been lessened if those grids had more distributed generation.⁴⁵

Finally, FiTs are likely to create jobs, especially in planning, construction, and maintenance of RE projects.⁴⁶ In the short term, FiTs may cause higher electricity rates for consumers—when compared against fossil-fueled electricity rates—and a reduction in fossil-fueled electricity jobs. However, in the long run, FiTs are expected to create new jobs at a rate that outpaces lost jobs, thus resulting in a net positive economic effect.⁴⁷

2. Current State of FiTs in the United States

FiTs represent the best path for quick and widespread deployment of RE in the United States. Unfortunately, implementing FiTs is not working well on the federal or state levels. On the federal level, Representative Jay Inslee of Washington State continually champions the cause. Inslee first advanced legislation in the U.S. House of Representatives in 2008 to create a national FiT program.⁴⁸ He reintroduced similar

44. U.S. ENERGY INFO. ADMIN., *supra* note 34, at 80-81. See also COUTURE ET AL., *supra* note 20.

45. The 2003 power failure was largely caused by a cascade of tripped power generators and transmission lines due to poorly managed electrical flow through the grid. See, U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations*, Apr. 2004, NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION (NERC), available at <http://www.nerc.com/filez/blackout.html> (last visited Feb. 26, 2012) (for a very detailed analysis of the causes). Certain experts in the field have postulated that distributed generation should spread out energy generation, and hence lessen stress on transmission lines, thereby avoiding transmission overcapacity. See, e.g., Xian Chen, Hieu Dinh & Bing Wang, *Cascading Failures in Smart Grid – Benefits of Distributed Generation*, UNIV. OF CONN., available at <http://www.engr.uconn.edu/~bing/Xian10-smart-grid.pdf>; Thomas E. Hoff, Howard J. Wagner, Christy Herig & Robert W. Shaw, Jr., *Distributed Generation and Micro-Grids*, CLEAN POWER RESEARCH, available at <http://www.clean-power.com/research/microgrids/MicroGrids.pdf> (discussing how PV and fuel cells can lessen the stress on transmission lines).

46. See, e.g., MAX WEI & DANIEL KAMMEN, ECONOMIC BENEFITS OF A COMPREHENSIVE FEED-IN TARIFF: AN ANALYSIS OF THE REESA IN CALIFORNIA 1 (2010), available at http://www.clean-coalition.org/storage/resources/studies/economic-benefits-of-a-fit/economic_benefits_of_a_comprehensive_feed-in_tariff-july072010.pdf (predicting that the proposed FiT in California, called the Renewable Energy and Economic Stimulus Act, will create and additional 280,000 jobs in California over 10 years).

47. *Id.* at 13-14.

48. H.R. Res. 6401, 110th Cong. (2008); see also Paul Gipe, *Representative Inslee Introduces US Feed-in Tariff Bill: Renewable Energy Jobs and Security Act, H.R. 6401* (June 27, 2008), <http://www.wind-works.org/FeedLaws/USA/RepresentativeInsleeIntroducesUSFeed-inTariff>

legislation in 2010.⁴⁹ However, a federal FiT faces opposition from conventional energy producers.⁵⁰ Also, other legislation that would have helped to unleash RE, such as a federal carbon tax or a scheme for tradable GHG emissions, failed in the summer of 2011.⁵¹

There are also valid concerns that a federal FiT will supersede state authority in setting energy rates, a role that states and their public utility commissions have historically held.⁵² States fear that a national FiT program, especially one that gives rate-setting authority to a federal entity, such as the Federal Energy Regulatory Commission (FERC), could preempt state authority over electricity systems.⁵³ Finally, RE presently is unable to compete with conventional fuels because fossil fuels are subsidized heavily. By some estimates, fossil fuels receive 12 times the amount of subsidies as the RE industry.⁵⁴ Given these obstacles, the pros-

Bill.html (last visited Feb. 26, 2012); see also WILSON RICKERSON ET AL., FEED-IN TARIFFS AND RENEWABLE ENERGY IN THE USA – A [sic]POLICY UPDATE (2008), available at <http://archives.eesi.org/files/Feed-in%20Tariffs%20and%20Renewable%20Energy%20in%20the%20USA%20-%20a%20Policy%20Update.pdf> (providing a good description of Rep. Inslee's bill).

49. Renewable Energy Jobs and Security Act, H.R. 5883, 111th Cong. (2010), available at <http://www.gpo.gov/fdsys/pkg/BILLS-111hr5883ih/pdf/BILLS-111hr5883ih.pdf>. His office also says that he proposes introducing another FiT bill in 2011. Personal communication from Patrick Meyer, Ph.D., Congressional Energy Policy Fellow to author, Ian Boisvert, renewable energy attorney (on file with author), (Mar. 4, 2011).

50. RICKERSON, *supra* note 48, at 13–14 (describing how it will not be easy to move a National FiT through Congress due to opposition from the conventional energy industry).

51. See Matthew Daly, *Climate Bill: Senate Democrats Abandon Comprehensive Energy Bill*, HUFFINGTON POST (July 22, 2010, 09:19 PM), http://www.huffingtonpost.com/2010/07/22/climate-bill-senate-democ_n_656175.html (last visited Feb. 26 2011); Gail Russell Chadcock, *Harry Reid: Senate Will Abandon Cap-and-Trade Energy Reform*, CHRISTIAN SCI. MONITOR (July 22, 2010), <http://www.csmonitor.com/USA/Politics/2010/0722/Harry-Reid-Senate-will-abandon-cap-and-trade-energy-reform> (last visited Feb. 26, 2012).

52. RICKERSON, *supra* note 48, at 14.

53. For example, the Federal Powers Act (FPA), 16 U.S.C. §§ 824d, 824e (2006), and Public Utility Regulatory Policy Act (PURPA), 16 U.S.C. § 2601 *et seq.* (2006), preempt state action in the realm of wholesale energy markets for the following reasons. The FPA preempts states from setting a wholesale price, as it specifies that only FERC has the power to set and approve wholesale rates of electricity. PURPA modifies FPA to a certain degree by allowing states to set wholesale price for certain qualifying facilities (QFs) of RE, and can even require that utilities purchase energy from QFs. PURPA also has preemptive action by limiting the wholesale price that a state can set to the utility's avoided costs. See SCOTT HEMPLING ET AL., RENEWABLE ENERGY PRICES IN STATE-LEVEL FEED-IN TARIFFS: FEDERAL LAW CONSTRAINTS AND POSSIBLE SOLUTIONS (2010), available at <http://www.nrel.gov/analysis/pdfs/47408.pdf> (for a general discussion of the preemption powers of the FPA and PURPA and how a state may work around those in creating FiTs).

54. See, e.g., Alex Morales, *Fossil Fuel Subsidies Are Twelve Times Support for Renewables*, BLOOMBERG (July 29, 2010, 9:59 A.M. PT), <http://www.bloomberg.com/news/2010-07-29/fossil-fuel-subsidies-are-12-times-support-for-renewables-study-shows.html> (last visited at Feb. 26, 2012)(in 2008, global expenditures to subsidize fossil fuels were \$557 billion, while

pect of a national FiT program in the near future remains speculative at best.⁵⁵

States have taken the lead in spurring RE, especially through the creation of Renewable Portfolio Standards.⁵⁶ States have also taken the first steps to enact FiTs. Given states' ongoing activity in the FiT arena, and the poor prospects of a national FiT, it is likely that states will continue to take the lead on FiTs. However, states have struggled to create effective programs.⁵⁷ Indeed, Gainesville, Florida, a municipality, has established the best FiT program in the United States. Given the small geographical impact of this program, its ability to be truly transformative is limited. A more detailed examination of FiT programs in different states follows in part two. These examples demonstrate that properly created state FiTs could spur an unprecedented wave of RE development. This is

only \$43-\$46 billion was provided to support RE through tax credits, feed-in tariffs and alternative energy credits). We suggest that it would not be necessary to increase RE subsidies until they reach the same level as fossil fuel subsidies; an organization like the FCB would help establish the appropriate price of RE, hence providing an alternative form of subsidy.

55. As described in Part III.C., *infra*, FiTs work best when rates are set at the cost of generation, plus a reasonable profit. Inslee's proposed legislation would not create a national FiT, but would merely free-up states to create FiTs by allowing them to set rates for RE at amounts higher than traditional avoided costs. The same legislation has also been taken up in the Senate by Senator Bernie Sanders. See *Senate Panel Approves Sanders Solar Power Bill*, U.S. SENATOR BERNIE SANDERS (JULY 21, 2010), <http://sanders.senate.gov/newsroom/news/?id=c3fb3098-6d0c-4190-ac0c-78b162a57f65>; see also *Summary of The Ten Million Solar Roofs Act of 2010 (S. 3460)*, U.S. SENATOR BERNIE SANDERS (JULY 21, 2010), <http://sanders.senate.gov/newsroom/news/?id=818d405d-b23e-4067-944c-dc224410624a>.

56. Renewable Portfolio Standards are state laws that require that utilities purchase a certain amount of RE. See generally Ryan Wiser, Christopher Namovicz, Mark Gielecki & Robert Smith, *Renewables Portfolio Standards: A Factual Introduction to Experience from the United States*, ERNEST ORLANDO LAWRENCE BERKLEY NATIONAL LABORATORY, April 2007, <http://eetd.lbl.gov/ea/ems/reports/62569.pdf>. Some of these programs allow a utility to purchase RE credits, essentially tradable credits for RE energy products created, rather than purchasing outright RE electricity. *Id.* at 3. Currently, 24 states, plus the District of Columbia, have RPS's in place. *States With Renewable Portfolio Standards*, U.S. DEP'T OF ENERGY, http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm (May 2009).

57. For a more detailed discussion, see *infra* at Part III.B. States that have created FiT programs so far are California, Vermont, Maine, Oregon, Wisconsin, and recently, Rhode Island. Paul Gipe, *Grading North American Feed-In Tariffs*, WORLD FUTURE COUNCIL 14 (2010), <http://www.wind-works.org/FeedLaws/USA/Grading%20N.Am.%20FITs%20Report.pdf>. Other states, such as Michigan, Indiana, and Hawaii, are well on their way to creating these programs. The World Future Council (WFC), however, came up with a system to judge the quality of FiT programs, using Germany and France's programs as the benchmarks of success, and hence assessing those programs with an "A" *Id.* Most of the North American programs received "F's", with Vermont receiving the highest mark of "D." *Id.*

where the FCB can have the vital role of assisting states to develop effective FiTs, and certify that they meet specified goals.

3. *Introducing the FiT Certification Board*

Our solution to America's floundering attempts is to create a non-profit, non governmental certifying board for FiT programs, the FCB. FiTs are complex laws that have to be precisely tailored to the needs of a jurisdiction—including the specific energy infrastructure, energy laws, and the varied physical landscape in regard to the feasibility and costs of different types of RE.⁵⁸ The FCB could provide guidance and assistance to states in developing effective FiTs tailored to the laws and unique landscape of each jurisdiction, and then arrange for certification of those FiTs, as warranted, based upon their ability to meet RE deployment goals. To accomplish this, the FCB's purpose will be to create a model FiT framework by combining the expertise of RE producers, utilities, government representatives, and top academics in economics and engineering. In addition to creating the model FiT framework, the FCB will arrange for and oversee certification of U.S. programs, likely through the use of a third-party certifying entity. The FCB will grade programs based on the model FiT framework to determine if the programs qualify as FiTs. Programs certified by the FCB will instill confidence and certainty in the success of the FiT program, which will encourage development of, and investment in, RE.

II. AN INDEPENDENT CERTIFICATION ORGANIZATION CAN HELP SPUR THE CREATION OF EFFECTIVE FiT PROGRAMS

The creation of a non governmental FiT certifying body, such as the FCB, would enhance the creation of strong FiT programs in the United States.⁵⁹ FiTs have many moving parts, however, and must be carefully tailored to each jurisdiction based upon its RE goals, the RE options available given the topography of the area, and the applicable laws and requirements. In short, when it comes to FiTs, there is no "one size fits all." That is where the FCB can help. At its core, the FCB would be an organization created and run by experts in the RE field. These ex-

58. COUTURE ET AL., *supra* note 20, at 15–60 (describing in detail the different considerations in setting rates under a FiT).

59. While there are certain organizations, such as the Interstate Renewable Energy Council (IREC), already tracking laws promoting RE and supporting and advocating for these laws, these organizations do not focus exclusively on FiTs and are not certifying those FiT programs. See INTERSTATE RENEWABLE ENERGY COUNCIL (IREC), <http://irecusa.org> (last visited Nov. 21, 2011). Given IREC's experience, however, they could clearly have an important role in the creation and management of a FiT certifying body like the FCB.

perts' sole purpose would be to advocate for, educate about, create core principles of, and certify FiT programs. Such an organization could provide both much needed technical assistance to state and local authorities seeking to create FiT programs, and legitimacy to those authorities who ultimately create bona fide FiT programs.

A. Non-Governmental Certification Boards Have Shown Success at Promoting Sustainability Goals

Two non-governmental certification boards exist to promote sustainability through forestry and green building practices. These certification boards provide examples for developing the FCB.

1. LEED Certification Fosters Green Building Standards

The nonprofit United States Green Building Council (USGBC) is an organization founded in 1993 by David Gottfried, a contractor and developer, Michael Italiano, an environmental attorney, and Rick Fedrizzi, with the intent to promote green building standards in the United States.⁶⁰ The early years of the USGBC's existence were focused on fostering an effective rating system.⁶¹ It was not until 1995, when Robert K. Watson, a scientist at the Natural Resources Defense Council, joined the USGBC and took charge of the certification efforts, that the USGBC created its now famous Leadership in Energy and Environmental Design (LEED) certification system.⁶² The USGBC, its governance, and its successful LEED program provide important models for the FCB.

Members of the USGBC come from the green construction industry—including architects, builders, developers, and product manufacturers—as well as from nonprofit organizations, academia, and government agencies.⁶³ The members number almost 20,000 are typically organizational, and are also called “communities.”⁶⁴ Member communities can also be “chapters,” which are geographically based sub-organizations.⁶⁵ According to the USGBC, members benefit from “discounts on products and services, LEED project registration and certification, courses and

60. *Building Design & Construction: White Paper on Sustainability*, N. AMERICAN INSULATION MFRS. ASS'N & WOOD PROMOTION NETWORK, 6–7 (Nov. 2003), available at www.usgbc.org/Docs/Resources/BDCWhitePaperR2.pdf.

61. *Id.*

62. *Id.* at 7.

63. *About Membership*, U.S. GREEN BLDG. COUNCIL (USGBC), <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1716> (last visited Nov. 21, 2011).

64. *Id.*

65. *See Frequently Asked Questions About USGBC Chapters*, USGBC, www.usgbc.org/ShowFile.aspx?DocumentID=6495 (last visited Nov. 14, 2011).

trainings, LEED Professional Credential exams, registration for the Greenbuild International Conference & Expo and more.”⁶⁶ Members also are listed in the LEED directory.⁶⁷

As a third-party certifier of design, construction, and operation of green buildings, the USGBC seeks a “prosperous and sustainable future for our nation through cost-efficient and energy-saving green buildings.”⁶⁸ The Green Building Certification Institute (GBCI) is the certifying arm of the USGBC.⁶⁹ The separation of the certifying responsibility from the rest of the organization promotes an impartial certification process.⁷⁰ The GBCI applies the LEED certification process to rate applicants.⁷¹

The USGBC has been carefully structured to meet its lofty goals of promoting green construction practices. The board has up to 25 directors who come from the member communities.⁷² The majority of directors are elected from the community members, but some are also appointed.⁷³ The board of directors for the USGBC meets at least once a year.⁷⁴ Elected directors serve up to six years, and appointed directors serve up to four

66. USGBC, *Lead*, <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19> (last visited Nov. 21, 2011).

67. *Lead Professional Directory*, GREEN BUILDING CERTIFICATION INSTITUTE (GBCI), <https://ssl11.cyzap.net/gbcicertonline/onlinedirectory/> (last visited Nov. 21, 2011).

68. *About USGBC*, USGBC, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=124> (last visited Nov. 21, 2011).

69. *Homepage*, GBCI, <http://www.gbci.org/homepage.aspx> (last visited Nov. 21, 2011).

70. The LEED certification program recognizes the quality of a building in at least five important areas: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. *See generally, Building Certification*, GBCI, <http://www.gbci.org/main-nav/building-certification/leed-certification.aspx> (last visited Nov. 21, 2011). While the GBCI runs the certification process, USGBC core programs are largely managed through committees answering to the Board of Directors and the executive offices, including the LEED Steering Committee, the Education Steering Committee, and the Chapter Steering Committee. These committees are staffed from the membership organizations. *About Committees*, USGBC, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1742> (last visited Dec. 5, 2011).

71. *About GBCI*, GBCI, <http://www.gbci.org/org-nav/about-gbci/about-gbci.aspx> (last visited Dec. 9, 2011).

72. *Bylaws*, USGBC, 4, 6 (June 2010), available at <http://www.usgbc.org/ShowFile.aspx?DocumentID=4875> (last visited Dec. 5, 2011).

73. As of 2010, the USGBC board included directors representing the following member groups: International; Green Affordable Housing; Production Home Builder; Educators (K-12/Post-Secondary); Contractors & Builders; Urban/Regional Planner; State & Local Government; Public Health/Health Care; Developer/Real Estate Services; Finance, Surety & Corporate Real Estate; Building Management & Operations; and, Product Manufacturers. *See Board Members*, USGBC, <http://www.usgbc.org/AboutUs/BoardMemberList.aspx?CMSPageID=131> (last visited Nov. 14, 2011).

74. USGBC, *supra* note 72, at 10 (Section 9 – Meetings).

years.⁷⁵ The board also elects specific officers, including a president/ chief executive officer,⁷⁶ chair, chair-elect, treasurer, and secretary.⁷⁷ In addition to electing a president and other positions, the board polices the operations of the organization to ensure that it meets the core vision and mission of LEED.⁷⁸

The USGBC's certification efforts drive the organization's impressive success in spurring green building practices.⁷⁹ The LEED-certification process scores a project or building on a scale of one to 100, and then

75. USGBC, *supra* note 72, at 8–9.

76. USGBC, *supra* note 72, at 12. The president/ chief executive officer position is the only paid position in the USGBC governance. USGBC, *supra* note 72, at 10.

77. USGBC, *supra* note 72, at 11–12. The officers also include an elected immediate past chair. *Id.* at 11. The board may also appoint other officers, each of whom has a title and duty that the board designates. *Id.* While the chair, immediate past-chair and chair-elect all hold office for one year, the treasurer and secretary each serve two years. USGBC, *supra* note 72, at 12.

78. USGBC, *supra* note 68 (providing an explanation of USGBC's mission).

79. For instance, according to USGBC's website, it now has 78 local affiliate chapters, at least 16,000 member companies and organizations, and at least 170,000 LEED Professional Credential holders. USGBC, *supra* note 68. The USGBC predicts that green building practices will "contribute \$554 billion to the US gross domestic product from 2009-2013." *Id.* The USGBC also calculates that, since 2000, through GBCI, it has certified "over 36,000 commercial projects and 38,000 single-family homes" as LEED compliant. Erin Emery, *One Billion Square Feet of LEED Green Building Projects Certified Worldwide*, GBCI, http://www.gbci.org/org-nav/announcements/10-11-12/One_Billion_Square_Feet_of_LEED_Green_Building_Projects_Certified_Worldwide.aspx (last updated Nov. 12, 2010). There has been some criticism that LEED certification has resulted in "green-washing" of the building industry, in that it does not deliver upon the promised energy efficiencies. A lawsuit on this very premise was filed by non-LEED certified contractors against USGBC on October 8, 2010, and amended on February 7, 2011, and includes claims, among others, that USGBC fraudulently misrepresented the energy gains from LEED certification. See Tristan Roberts, *USGBC, LEED Targeted by Class-Action Suit*, BUILDING GREEN, <http://www.buildinggreen.com/auth/article.cfm/2010/10/14/USGBC-LEED-Targeted-by-Class-Action-Suit/> (last updated Oct. 14, 2010); see also Jennifer J. Hicks, *Lawsuit Challenging Legitimacy of LEED Program Could Have Major Implications*, NAT'L L. REV. <http://www.natlawreview.com/article/lawsuit-challenging-legitimacy-leed-program-could-have-major-implications> (last updated Nov. 3, 2010); see also Chris Cheatham, *Gifford's LEED Lawsuit Takes New Shape*, GREEN BUILDING LAW UPDATE, <http://www.greenbuildinglawupdate.com/2011/02/articles/legal-developments/giffords-leed-lawsuit-takes-new-shape> (last updated Feb. 9, 2011). To counter these allegations, and to prove the effectiveness of LEED building standards, USGBC has recently improved and emphasized its certification for the ongoing operation and maintenance of existing buildings, an ongoing review process that tracks the environmental gains from LEED certification. See, e.g., Michael Mergens & Julie Perrus, *The Legal and Business Case for LEED Certification in the Post-Recession World*, A.B.A. BUS. LAW SECTION, <http://apps.americanbar.org/buslaw/blt/content/2011/01/article-mergens-perrus.shtml> (last updated Jan. 27, 2011).

provides a level of certification based upon that score.⁸⁰ What is more, this success may be producing profound beneficial environmental effects. For example, by promoting energy conservation, LEED certified buildings use less energy, most of which comes from fossil-fuel sources.⁸¹ The U.S. Environmental Protection Agency (EPA) calculates that buildings in the United States account for 38.9 percent of the nation's total carbon dioxide emissions, 38.9 percent of energy consumption, 13 percent of water consumption, and 72 percent of electrical consumption.⁸² Further bolstering this point, a 2008 combined USGBC and EPA study concluded that LEED certified buildings are, on average, 25–30 percent more energy efficient than their non-LEED counterparts.⁸³ The USGBC predicts that, by relying on increased building efficiency, up to 85 percent of future U.S. energy demand can be met while concomitantly creating up to 2.5 million more jobs.⁸⁴ LEED standards have now become part of operational practices for many state and local governments, and even some federal agencies are implementing LEED.⁸⁵

The USGBC serves as a vital model for the FCB. First, its membership base includes industry practitioners, government employees, and academics, among other groups, representing a cross-section of entities with an interest in the organization's goals. The FCB, also with multi-disciplinarian goals just like the USGBC's, should strive similarly to have a diverse and well-versed membership. Second, the USGBC's governance represents a model that can be followed by the FCB. For instance, both organizations should place a high value on a board of directors representative of the various and diverse members, something that will help to ensure the impartiality and fairness of the board and that they have the proper technical expertise to carry out their obligations. Finally, the manner in which the USGBC certifies buildings that meet its rating system may provide the most potent model for the FCB's certification of FiT programs. Just as the third-party GBCI must consider many complex components of a project to determine if it meets the vari-

80. *How to Achieve Certification*, USGBC, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1991> (last visited Dec. 9, 2011). The certification process also awards up to 10 bonus credits, which makes the highest achievable score 110. *Id.*

81. See, e.g., Cathy Turner & Mark Frankel, *Energy Performance of LEED for New Construction Buildings: Final Report (2008)*, USGBC & NEW BUILDINGS INST. (NBI), available at <http://www.usgbc.org/ShowFile.aspx?DocumentID=3930>.

82. *Buildings and Their Impact on the Environment: A Statistical Summary*, EPA 2, 3 (Apr. 22, 2009), <http://www.epa.gov/greenbuilding/pubs/gbstats.pdf>.

83. Turner & Frankel, *supra* note 81, at 5.

84. USGBC, *supra* note 68.

85. For example, the Departments of Defense, Agriculture, Energy, and State, and the Environmental Protection Agency all have LEED initiatives. *Who Uses LEED?*, USGBC, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2492> (last visited Nov. 21, 2011).

ous relevant criteria, a certifying arm of the FCB will need to similarly judge FiT programs as meeting potentially complex criteria established by the governance board of the organization. In short, given their similarities, the FCB should be able to build upon the USGBC's successful model to quickly become an effective organization that embodies credibility and respect in its certification process.

2. *Forest Stewardship Council Certification Fosters Sustainable Forestry Practices*

Another example of a non-governmental certification program encouraging environmentally sound practices, in this case sustainable forestry, is the Forest Stewardship Council (FSC).⁸⁶ Over-logging and improper management of forests are historic and persistent problems.⁸⁷ The FSC was established in 1993 shortly after the Rio De Janeiro Convention on Biological Diversity as a response to these practices.⁸⁸

The FSC has a governance structure that is less formalized than the USGBC. The FSC, as originally conceived, includes individual "representatives" from developed and developing nations, coming from various forestry perspectives and backgrounds, including nonprofit organizations, professional foresters, and regulators.⁸⁹ The FSC's nine-member board of directors are voted into office by FSC representatives after a public notice and comment process.⁹⁰ The FSC board of directors are tasked with the issuance of more detailed rules—called policies and standards—to implement the Principles and Criteria of the organization.⁹¹ As with LEED, the FSC uses an independent third-party accreditation organization, Accreditation Services International, to carry out the certifying tasks of the organization.

The FSC General Assembly is the governing body of the FSC, and encompasses three chambers—Environmental, Social, and Economic—

86. While we view the FSC model as less pertinent to the FCB given its looser structure, it still provides a relevant model of a non-governmental certifying body promoting sustainability practices. See generally FOREST STEWARDSHIP COUNCIL, *The History of FSC-US*, http://www.fscus.org/about_us (last visited Dec. 9, 2011) (describing how the goal of the FSC is to foster sustainable forestry practices).

87. DAVID HUMPHREYS, *FOREST POLITICS: THE EVOLUTION OF INTERNATIONAL COOPERATION* 2-5 (2009).

88. *History of FSC*, FSC, <http://www.fsc.org/history.html> (last visited Nov. 14, 2011).

89. *Governance*, FSC, <http://www.fsc.org/governance.html> (last visited Nov. 14, 2011).

90. *Id.*

91. *FSC Policies and Standards*, FSC, http://www.fsc.org/policy_standards.html (last visited Nov. 21, 2011).

which are further divided into North and South sub-chambers.⁹² This balance of power allows the FSC to minimize the limits it puts on who can be members.⁹³ The member representatives, along with the board of directors, officers, and others, meet every three years at the FSC General Assembly to make critical decisions.⁹⁴ The FSC General Assembly establishes the umbrella Principles and Criteria that serve as the backbone values for forestry practice certifications by the FSC.⁹⁵ According to the FSC, as of 2008 it had certifications in over 80 countries, more than 100 million hectares of forest were being managed under programs certified by the FSC, and 18 FSC accreditation bodies were in existence.⁹⁶

The FSC represents a useful paradigm for the FCB as an example of how an organization can certify programs that vary greatly. In the case of the FSC, these variations come from different laws that apply in a given area regarding forestry practices, as well as the ecological characteristics of the forests that are the focus of the certifications.⁹⁷ Comparatively, the USGBC certifies green building codes that can be implemented uniformly no matter the location of the project. Just as will be required of the FCB, the FSC recognizes that it must be flexible in how it applies its Principles and Criteria to any individual forestry area by specifying that “[certification] decisions will be taken by individual certifiers, and guided by the extent to which each Criterion is satisfied, and by the importance and consequences of failures. Some flexibility will be allowed to cope with local circumstances.”⁹⁸ As a result, the FCB can learn from the broad nature of the FSC’s Principles and Criteria, and from how those get applied on individual bases to achieve the organization’s goals.

92. *FSC General Assembly*, FSC, <http://www.ga.fsc.org/generalassembly.html> (last visited Dec. 10, 2011).

93. FSC, *supra* note 89.

94. FSC, *supra* note 89.

95. *Principles and Criteria Review*, FSC, <http://www.fsc.org/pcreview.html> (last visited Nov. 14, 2011).

96. *FSC Reflected in Scientific and Professional Literature: Literature Study on the Outcomes and Impacts of FSC Certification*, FSC, 9 (2009), <http://www.cbd.int/doc/meetings/for/lgbushmeat-02/other/lgbushmeat-02-fsc-02-en.pdf>.

97. *Id.* at 11; *See also id.* at 26 (discussing how sustainable forestry and biodiversity goals are set both local social and biological factors, and therefore FSC certification should reflect these differences).

98. *FSC Principles and Criteria for Forest Stewardship*, FSC, 3 (last amended 2002), http://www.fsc.org/fileadmin/web-data/public/document_center/international_FSC_policies/standards/FSC_STD_01_001_V4_0_EN_FSC_Principles_and_Criteria.pdf.

B. The FCB Would Foster and Encourage Renewable Energy Deployment in the United States

1. Functions and Organization of the FCB

Just as the USGBC and the FSC have accelerated green building and sustainable forestry practices, we believe that an FCB could accelerate the creation of effective FiT programs in the United States.⁹⁹ While the structure of the FCB would ultimately be up to its founding members, we provide our perspective.¹⁰⁰ First, the primary function of the FCB should be creation of effective FiT criteria for the U.S. market, and then certification of FiT programs that meet the criteria through a third-party certifying body. Readily available FCB-established criteria would provide important direction and guidance to state and local governments seeking to draft FiT legislation, and give the resultant FiT programs legitimacy through the FCB's certification process. Secondary functions of the organization could be providing educational services to individual lawmakers and legislatures about FiTs and the FCB certification process, organizing conferences on FiTs and RE development, sponsoring studies, creating publications, and drafting articles. Later, the FCB could establish a lobbying function to help speed up FiT adoption in the United States, though members must be mindful to properly insulate this function from the rest of the FCB's activities in order to maintain objectivity and credibility of the certification process.

Regarding the structure of the organization, we believe that the FCB would best operate as a membership-based organization comprised primarily of professionals working in the RE field. RE advocates, academics, and government employees could also serve a smaller, albeit important, role in the organization. Membership fees would be charged to help limit membership to those truly interested and to raise operational funds. As with the FSC, there should be intermittent gatherings of members to discuss and refine the FiT core principles, provide feedback to the

99. The FCB has some inherent advantages in regard to affectuating change as compared to the USGBC and FSC. While these other organizations certify individual projects or activities, one-by-one, the FCB will certify framework programs, i.e. state and local FiT programs, that will continually achieve the beneficial goal - the deployment of RE - into the future. Hence, the beneficial work of the FCB will be leveraged through this process.

100. This new organization could be established as either a nonprofit corporation or association. The most significant differences are that corporations have more rigorous and extensive formative documentation, such as articles of incorporation and by-laws, more rigid structure, such as a board of directors, and, in return, provide greater immunity to members and officers from tort claims. Associations have very limited structural requirements, but in return, do not afford the same level of immunity. See, e.g., Anna Maria Mendez, *Nonprofit corporations vs. Nonprofit associations*, TEXAS C-BAR, http://www.texasbar.org/content/legal_library/corp_structure/downloads/pre-incorp-Chart.pdf.

FCB on how its programs are working, and vote on important organizational matters, including electing directors and officers.

The FCB should be managed by a diverse board of eleven directors. As with the USGBC, it will be imperative that the board of the FCB represent all of the interests it serves, not be beholden to any one group through its voting functions, and contain the technical expertise to carry out the organization's mission. To attain these goals, nine of the directorships could be elected by majority vote of the general membership. This will ensure that the board will largely be elected by the general membership, and hence create legitimacy in the eyes of the membership. To create balance, the elected directorships should be specifically allocated to certain interest groups so that no one interest group has a majority vote on the board. Toward that end, of the nine elected spots, four should go to representatives from the RE industry, divided evenly between solar, wind, biomass power, and one of the developing RE technologies (such as marine or biogas), and one directorship each should go to representatives from RE advocacy groups, state or local governments, retail utilities, academia, and the federal government.¹⁰¹

While it is important that the RE industry has a large representation on the board, given their expertise in the particular technologies being promoted through FiTs, the creation of effective FiTs is largely within the political and economic realm. Hence, regulators and academics are also vital to the organization's goals. For this reason, RE interests should only have four votes on the board, a minority interest. Moreover, no particular technology should be given an advantage over others, but rather each should have an equal and independent vote to ensure equal consideration in the certification process of each potentially applicable RE technology. This balance of representatives on the board of directors of the RE industry with regulators, nonprofit interests, and academics will be vital in achieving the goals of the FCB.

These nine elected directors, who would serve for a fixed term—perhaps three years—would be responsible for selecting and appointing two at-large directors, although not from the RE industry to avoid upsetting the balance on the board. The appointed directors would serve shorter terms—perhaps two years. Having two at-large directorships would allow the nine elected directors to identify gaps in expertise or experience on the board necessary to carrying out the mission of the or-

101. The most obvious federal agency to be involved would be the National Renewable Energy Laboratory. Federal employees, however, have certain ethical constraints against outside employment or activities that might limit their participation. See 5 C.F.R. § 2635.802 (2009). If it is not possible to obtain a federal representative as a director, this slot could be reserved for an additional state or local government representative.

ganization, and fill those gaps by offering directorships to specific individuals with the necessary qualities or credentials. Moreover, having only two at-large directorships will ensure that the board remains a predominantly elected body that is ultimately accountable to the FCB membership.

The ultimate responsibility of establishing criteria for a FiT and running the organization would fall to the board of directors. We recommend that FiT criteria only be adopted or changed with a majority of directorship votes. However, to run the day-to-day affairs of the organization, the board should hire professional managers, including a president, vice-president, treasurer, and secretary. These would likely be the only paid positions in the organization. The board may also establish committees made up of members to help perform specific tasks. For instance, committees might be established to research the best model for specific FiT core criteria, oversee certification efforts, fundraise, organize conferences, create publications, draft articles, perform consulting services, or deal with membership issues.

2. *Funding for the FCB*

For the FCB to begin and thrive, it must be adequately funded. We propose that the most likely source of initial funding would be through nonprofit and government grants. Thereafter, we believe that the FCB could maintain its funding through ongoing applications for grants, fees for program certifications and membership, and revenue from consulting services and organizing conferences. In return for their fees or donations, members and sponsors could be acknowledged in the FCB's publications and on its website, as well as receive discounts for FCB-sponsored events, FCB publications, and conferences.

Of course, the FCB must ultimately be financially self-supporting. Both LEED and the FSC have been able to achieve this mark of success in different ways. For instance, the USGBC raised \$64 million in 2008, with the largest contributors being \$16 million from certification fees, more than \$14 million from registration and conference fees, and \$10 million from its publications.¹⁰² The FSC, on the other hand, raises the majority of its funding from charitable foundations and government donors, with a smaller amount coming from membership subscriptions and accreditation fees.¹⁰³ The FSC does not accept funding from industry, other than a

102. Marie Rohde, *USGBC Is All About Green . . . in More Ways Than One*, DAILY REP. <http://dailyreporter.com/blog/2010/08/16/usgbc-is-all-about-green-in-more-ways-than-one> (last updated Aug. 16, 2010).

103. In 2008, FSC donors of greater than \$20,000 included: Rockefeller Brothers Fund; Town Creek Foundation; The Home Depot Foundation; Hayward Family Foundation; Fox

small amount from its corporate members, as it believes this helps to ensure its independence.¹⁰⁴

Between the LEED and FSC examples, the FCB would do better to follow the FSC funding model. The USGBC is able to collect strong revenue through its LEED certification fees because it certifies thousands of projects each year. Moreover, the recipients of LEED certification are willing to pay relatively high fees due to the added value to their projects from the certification.¹⁰⁵ In contrast, the recipients of FCB certification will often be cash-strapped state and local governments, and therefore the opportunity to collect much in the way of certification fees will be limited. Also, to avoid conflicts of interest, the FCB should be wary of accepting too much corporate funding, even if it comes from its own members. Therefore, grants and conference fees may be the best source of revenues for the organization, after foundation money or government grants. One fertile area of funding could be the inclusion of a small, fixed commission in each electricity contract entered into under a FCB-certified FiT program, as this would provide a dedicated, steady stream of financing without strings attached.

3. *Establishing FiT Criteria and the Certification Process*

Establishing appropriate and adaptable FiT criteria for the United States, as described earlier, would be a vital function of the FCB. As the FCB board of directors would include professionals with specific expertise in areas pertaining to FiT implementation, it would be uniquely qualified to establish these criteria. Similarly, the FSC board of directors helps to develop the sustainable forestry practices core Principles and Criteria, as well as the implementing policies and standards. The FCB could also work directly with regulators and lawmakers to help adapt the FCB criteria to the specific laws and conditions of each jurisdiction, much in the same way that the FSC adapts its certification criteria to each different forest it serves.

Foundation; and, FSC Global Fund. See *How Is FSC Funded?*, FSC, http://www.fscus.org/about_us/funding.php (last visited Nov. 14, 2011).

104. For instance, in 2001, 85 percent of FSC funding came from governments and foundations, whereas only 15 percent came from membership and accreditation fees. See Elizabeth Stryjewski, *The Sustainable Forest Initiative vs. The Forest Stewardship Council: Evaluating the Credibility of Competing Forest Certification Schemes* 8 (Fall 2007) (unpublished paper, UNIV. OF CAL., SAN DIEGO), available at <http://irps.ucsd.edu/assets/021/8433.pdf>.

105. See Beth Anderson, *LEED Certification Program Leads to Potential Profits: Property investors seek LEED certification for improved efficiency, better returns*, NUWIRE INVESTOR, <http://www.nuwireinvestor.com/articles/leed-program-leads-to-potential-profits-51367.aspx> (last updated Dec. 3, 2007).

The second major function of the FCB would be to judge and ultimately certify FiT programs. Given the goal of the FCB to foster the rapid creation of effective FiT programs, the certification process need not be overly complicated. We propose that each FiT program seeking certification be graded on a scale of one to 100, as with LEED, and that programs scoring above a certain amount be certified.¹⁰⁶ As a floor, an FCB-certified program must spur RE development sufficient to meet identified RE deployment goals, such as a Renewable Portfolio Standard (RPS), in as cost-effective a manner as possible. As a result, a simple “pass” or “fail” of a program as meeting the minimum criteria should be adequate. However, some level of additional recognition should be built into the system to recognize more robust and cost-effective programs, such as identifying them with stars or numeric rankings. Such additional recognition should help attract more potential investors and promoters of RE projects to the jurisdiction given the higher level of confidence in an effective FiT program. Finally, the additional recognition should also ewqES the jurisdiction for its additional efforts.

In regard to the certifying arm of the FCB, we believe that the board should either delegate the certification duties to an independent committee or contract with a third-party organization to provide the certification services, similar to both the FSC and the USGBC. Having an independent certifying arm would serve to insulate the certifying function of the organization from the rest of its functions, and hence avoid any conflicts of interest. Insulating the certification duties from the rest of the functions of the FCB may also ultimately allow the organization to engage in activities that are completely at odds with its certifying function, such as political lobbying.

Finally, certification should occur both at the time of creation of a FiT program as well as on an ongoing basis. This is consistent with how LEED now certifies its buildings. The FCB’s ongoing review of certified FiT programs could examine how quickly RE projects are being deployed under the program and whether tariffs are being properly set. Such follow-through will be vital to ensure that the FCB certified FiT programs are working as intended.

106. This numerical system is also consistent with the ranking system already created by the World Future Council for FiT programs, which recently graded most of the early United States-created FiTs as extremely poor. Paul Gipe, *Grading North American Feed-In Tariffs*, WORLD FUTURE COUNCIL, <http://www.wind-works.org/FeedLaws/USA/Grading%20N.Am.%20FITs%20Report.pdf>.

4. Benefits of the FCB

FCB action will have both direct and indirect benefits. Direct benefits are numerous and can be large. The first benefit is the potential attraction of large amounts of investment capital for RE projects because FCB certification will help provide comfort and certainty to RE investors and project developers. FCB certification will send a strong signal to investors and developers that the program spurring RE development is robust and well designed. This is important because there are currently laws that are not FiTs but call themselves such.¹⁰⁷ It is also important because, if the deployed project is well-designed, a FiT can give a respectable financial return. While a well-designed FiT does not guarantee such a return, if it properly calculates the project costs it should provide substantial certainty.¹⁰⁸ FCB certification will help ensure that costs are properly set.

Credibility of FiT programs is the second benefit. Our design for the FCB aims to build a neutral body with the highest professional integrity. Neutrality is created by having a balance of industry, government, nonprofit, and academic representatives. Integrity ought to emerge because these Board members will act as checks and balances on each other's interests. Neutrality and integrity, and of course a strong knowledge base, are important blocks to build credibility because the FCB's decisions to certify or not need to withstand scrutiny. While the FCB will ultimately be judged on the services it provides to governmental entities and upon the successes of the FiT programs that it certifies, credibility will be very important in the early going as the FCB seeks to establish the importance of its services.

Accelerating RE deployment, especially distributed generation projects, is the third and perhaps most important benefit. Acceleration will occur in two ways. First, RE development will be directly created through the action of FiT programs certified by the FCB. Obviously, the FCB certification criteria will be geared toward maximizing RE deployment, especially to meet minimum defined targets, such as RPS goals, so any program certified by the FCB should, theoretically, be successful at

107. See H.B. 3690, 2010 Leg., Special Sess. (Or. 2010), available at <http://www.leg.state.or.us/10ss1/measpdf/hb3600.dir/hb3690.en.pdf> (describing the Act as "relating to feed-in tariffs on solar photovoltaic energy systems.").

108. As has been seen in Germany, Ontario, and other areas with well-constructed FiTs, investment financing flows once cash returns are guaranteed via long term contracts. Lorinc, J., *Climate Change Policy and Safe Investing*, N.Y. TIMES, Oct. 27, 2009, available at <http://green.blogs.nytimes.com/2009/10/27/climate-change-policy-and-safe-investing/> (describing a study by Deutsche Bank's global-asset management group and Columbia University's Earth Institute concluding that FiTs represent the safest harbors for investors looking to finance clean-energy ventures).

fostering RE development. Second, the benefits bestowed upon jurisdictions successfully implementing FCB-certified programs, and reaping the benefits of greater RE development, will entice other jurisdictions to follow suit. The technical consulting and educational activities of the FCB should only help assist this adoption. This increased RE deployment can then be relied upon by states, utilities, and others to meet federal, state, or local RE deployment targets. Indeed, as some—including the U.S. government—have suggested, FiTs may be one of the best ways that many states will be able to ensure that state-mandated RPS goals are met.¹⁰⁹

A final, and more speculative, direct benefit of FCB certification would be additional government recognition, subsidies, or grants for those jurisdictions operating FCB certified programs. For instance, if the federal government seeks to spur RE deployment, rather than creating its own program, it could simply provide grants or other funding to those states operating strong FiTs. This would both reward those states with effective programs, and could soften the impact on ratepayers by allowing payments to retail utilities under the FiT to be offset by federal dollars. FCB certification should be a good identifier of states worthy of receiving federal dollars targeted at accelerating RE deployment.

Having more deployed RE, especially distributed generation projects, leads us to the indirect benefits. First, more RE electricity reduces reliance upon fossil-fuel generated electricity. That reduces fossil fuels' negative externalities. Reducing fossil fuel reliance will have secondary benefits that are no less important, including scaling back harmful GHG emissions, as well as curtailing more localized externalities like water and air contamination. Second, as FiTs favor distributed generation projects in place of large scale energy projects, it will scale down the costs of RE deployment, because these smaller projects located closer to demand centers will not require expensive construction of transmission lines. Third, increased RE development through a properly crafted FiT program should increase energy security and create additional jobs. Finally, RE deployment through a FiT program should result in additional tax revenues for state and local governments due to increased income taxes from greater employment, as well as more directly from fees charged to participants in the FiT.¹¹⁰

109. *Solar Powering Your Community: A Guide for Local Governments*, DOE, http://solar.americacomunities.energy.gov/resources/guide_for_local_governments/2/3/ (last visited Nov. 14, 2011).

110. See, e.g., MAX WEI & DANIEL KAMMEN, RENEWABLE AND APPROPRIATE ENERGY LABORATORY, ENERGY AND RESOURCES GROUP, UNIVERSITY OF CALIFORNIA, BERKELEY RENEWABLE AND APPROPRIATE ENERGY LAB. ENERGY AND RES. GRP., ECONOMIC BENEFITS OF A COMPREHENSIVE FEED-IN TARIFF: AN ANALYSIS OF THE REESA IN CALIFORNIA, 16–19 (2010), available

In sum, the sooner the FCB forms and begins its work, the sooner it can begin promoting and assessing FiT programs. We anticipate the certification process will move state and local FiT programs to a more standardized format. Standardization will help the FCB accelerate FiT implementation and RE deployment around the country. Other FCB activities, such as consulting, organizing conferences, issuing publications and articles, providing educational and consulting services, and public outreach, could similarly help accelerate effective FiTs, and concomitant RE development, in the United States.

III. FiTs AROUND THE WORLD PROVIDE CORE PRINCIPLES FOR THE FCB TO EVALUATE FUTURE FiT PROGRAMS

One of the main functions of the FCB will be to certify FiT programs. In order to do so, the certifying body of the FCB must develop a model framework that incorporates certain characteristics of successful FiT programs. The certifying body will evaluate the program, consider the relevant economic, legal, and political factors, and recommend that the program incorporate certain principles in order to be successful. By examining FiT programs from around the world and the United States, we have compiled a list of characteristics that appear in the more successful FiT programs and which are not present in the less successful programs. We recommend that the certifying body of the FCB incorporate these principles into its model framework and use them to create and certify successful FiT programs in the United States.

A. Successful FiTs

1. Germany

As previously discussed, Germany's FiT law has led to outsized RE deployment when compared internationally. Solar, on- and off-shore wind, and geothermal generators have sprung up all over Germany. For example, as of 2010, with their 9.8 installed gigawatts, solar arrays in Germany represent 47 percent of the world's installed solar capacity.¹¹¹ Indeed, Germany's FiT program has set the gold standard the world over.

at http://www.clean-coalition.org/storage/resources/studies/economic-benefits-of-a-fit/economic_benefits_of_a_comprehensive_feed-in_tariff-july072010.pdf (predicting that the proposed FiT in California, called the Renewable Energy and Economic Stimulus Act, will create an additional 280,000 jobs in California over 10 years).

111. REN21, RENEWABLES 2010 GLOBAL STATUS REPORT, 19 Fig. 8 (2010), available at http://www.ren21.net/Portals/97/documents/GSR/REN21_GSR_2010_full_revised%20Sept2010.pdf.

Predictably, the German FiT program has all three characteristics of a successful FiT: (1) predictability, (2) a cost-based framework, and (3) differentiated tariffs. First, notwithstanding some policy changes, Germany's FiT program's predictability rests on stability and continuity that have persisted since it was initially put into place in 1990.¹¹² Second, German municipal utilities spearheaded a cost-based framework allowing FiT prices based on the actual costs of RE generation.¹¹³ Finally, Germany's Renewable Energy Sources Act¹¹⁴ (passed in 2000) began differentiating tariffs depending on the technology, project size, location, and resource quality.¹¹⁵ With all three of these characteristics present, Germany's FiT program continues to prevail as the model by which other FiT programs are judged.

2. Spain

Spain's FiT program did not start out so well. Spain's FiT program imposed limits on the maximum and minimum that could be paid to RE generators per megawatt-hour.¹¹⁶ Those limits greatly increased policy costs at certain times.¹¹⁷ But Spain recently increased the amounts payable to generators, and now their program looks far more likely to succeed because it has the three necessary characteristics.

For example, the Spanish program has predictability in that it has existed since 1997.¹¹⁸ However, owing to changes resulting from its experiment with the imposed limits just described, its continuity is not as strong as Germany's. And it does have a cost-based framework, but right now it is only for solar photovoltaics, and it relies on an auction bid system.¹¹⁹ Spain's program also does differentiate based on technologies as demonstrated by its current FiT payment levels.¹²⁰ Most troubling, however, is that Spain recently announced it was considering retroactive

112. COUTURE ET AL., *supra* note 20, at 9, 11.

113. *Id.* at 9.

114. *Act on Granting Priority to Renewable Energy Sources (Renewable Energy Sources Act) from March 29th, 2000*, FED. MINISTRY FOR THE ENV'T, NATURE CONSERVATION AND NUCLEAR SAFETY, available at http://www.bmu.de/english/renewable_energy/doc/3242.php (last visited Feb. 26, 2012).

115. *Id.* at 10.

116. *Id.* at 52.

117. *Id.* at 53, Fig. 13.

118. *Id.* at 9

119. *Id.* at 8.

120. FED. MINISTRY FOR THE ENV'T, NATURE CONSERVATION AND NUCLEAR SAFETY, *supra* note 114, at App. B.

reductions for its FiT payment scheme.¹²¹ Such action creates an environment of regulatory risk that might dissuade future investors. Although Spain's FiT program has followed a more adventurous trajectory than Germany's, it still offers hope that it will continue to lead to more RE deployment.

3. Gainesville, Florida

Gainesville, Florida, shines as the sole example of a successful U.S. FiT program. Contracts under the policy embody stability because they are designed to run 20 years.¹²² Furthermore, the policy is unique in the United States for being cost-based.¹²³ Yet, Gainesville's FiT program is far from brilliant. Currently, it only covers one technology—solar photovoltaic—thereby differing from European policies which cover a wider variety of RE technologies.¹²⁴ However, the program has only been around since 2009,¹²⁵ so it should be afforded time to mature and develop.¹²⁶ In the meantime, it still stands out among an underwhelming group of American FiT programs.

B. Unsuccessful FiTs

1. Oregon

At first blush, Oregon's House Bill 3690¹²⁷ might look like it has the ingredients to become a successful FiT law. After all, it arguably has some inherent predictability since rates will be set for 15 years as of the time of enrollment.¹²⁸ It also technologically differentiates to the same

121. Emma Boyde, *Investors Make Waves In Climate Policies*, FIN. TIMES, Mar. 13, 2011, available at <http://www.ft.com/intl/cms/s/0/2be6ea54-4c21-11e0-82df-00144feab49a.html#axzz1OezZe700> (last visited Feb. 26, 2012).

122. Gainesville, Fla., Ordinance 080566 §2, App. A.(1)(i)(1)(B)(iii) (Mar. 1, 2009), available at <http://www.gru.com/Pdf/AboutGRU/News/FIT/2009%20FIT%20Ordinance%20CLEAN.pdf>.

123. Toby Couture & Karlynn Cory, *State Clean Energy Policies Analysis (SCEPA) Project: An Analysis of Renewable Energy Feed-in Tariffs in the United States*, NAT'L RENEWABLE ENERGY LAB. (NREL) 8 (2009), available at <http://www.nrel.gov/docs/fy09osti/45551.pdf>.

124. *Id.* at 9.

125. *Id.* at 8.

126. See Claire Kreycik, Karlynn Cory & Toby D.Couture, *Feed-in Tariff Policy: Design, Implementation and RPS Policy Interactions*, NREL, 12 (2009), available at <http://www.nrel.gov/analysis/pdfs/45549.pdf> (noting that frequent updates to the FiT program structure can result in policy uncertainty which makes RE investment riskier and less attractive to investors).

127. H.B. 3690, 2010 Leg., Special Sess. (Or. 2010).

128. Act of Mar. 18, 2010, ch. 78, Or. Laws 1 Spec. Sess., sec. 2, §757.365(4), available at http://www.leg.state.or.us/bills_laws (last visited Feb. 26, 2012).

extent as the Gainesville program: only for solar.¹²⁹ But that is where comparisons with Gainesville's program end.

Unlike other successful FiT programs, mostly in Europe, that base future payments upon predetermined degressive rates, Oregon's "volumetric incentive rates" approach adjusts rates based upon the demand garnered by each phase of the program, which ultimately provides less certainty.¹³⁰ Additionally, while the Oregon Public Utilities Commission (OPUC) must implement the pilot project set up under HB 3690,¹³¹ residential generators are not guaranteed payment for the solar-derived electricity actually produced, as there is not a requirement that all electricity produced by one of the qualifying generators be purchased.¹³² As one commentator put it, "[a] true FiT encourages installation of more solar capacity, but [OPUC] is requiring new installations to be limited in size so they do not exceed the average consumption on the site."¹³³ Finally, because Oregon's scheme relies on notions of "value"¹³⁴ to determine what generators might be repaid, it is not a cost-based program.¹³⁵ Oregon's program is not so much a FiT as a chimera of one.

2. California

California's current FiT program likewise is deficient. It lacks a cost-based framework. Instead it uses an "avoided cost" measure based on the state's utilities' market price referent.¹³⁶ And while it may have cost differentiating features, two problems exist. First, it differentiates tariffs based on time of day.¹³⁷ That results in far less predictability for RE generators. Second, the little technology differentiation initially heavily favored water and wastewater facilities, which are customers of investor-owned utilities, although that changed in 2007.¹³⁸ As one report

129. *Id.* at §757.360(3).

130. *Id.* at §757.365(1); Kreycik et al., *supra* note 126.

131. Act of Mar. 18, 2010, ch. 78, Or. Laws 1 Spec. Sess., sec. 2, §757.365(1).

132. *Id.* at §757.365(4).

133. Jen Gleason, *Oregon's New Solar Law Not a Good FIT*, ENVTL. LAW ALLIANCE WORLDWIDE (ELAW) (Nov. 11, 2011 12:33 PM), <http://elawspotlight.wordpress.com/2010/06/08/oregons-new-solar-law-not-a-good-fit>.

134. Act of Mar. 18, 2010, ch. 78, Or. Laws 1 Spec. Sess., sec. 1, §§757.360(5); sec. 2, 757.365(4).

135. COUTURE ET AL., *supra* note 20, at 12.

136. *Id.* at 16. *See also* COUTURE & CORY *supra* note 123, at 11 (for further discussion on "market price referent").

137. RICKERSON ET AL., *supra* note 48, at 4 (2008) ("[A]ll technologies are offered the same price, but that this price varies depending on whether the electricity is generated during peak or off-peak times.").

138. The original program design limited FiTs to renewable technologies sites at waste and wastewater treatment facilities but in 2007 eligibility was extended to all customer

said, “[b]ecause the payment levels offered remain too low to drive development in most RE technologies, the California FIT is not viable as a stand-alone policy.”¹³⁹

One other undesirable feature that California and Oregon share is low program caps. California’s program is capped at 478.4 megawatts.¹⁴⁰ Oregon’s is 25 megawatts.¹⁴¹ Both are too low for RE developers to take advantage of economies of scale.

C. Core Principles Strengthen Fundamental Characteristics of Successful FiTs

We have noted above what three characteristics are essential for FiTs to exist as FiTs and not as simulacrum of such. Those characteristics are the skeleton on which we add the following core principles; the connective tissue that keeps the skeleton upright and strong. By examining successful and unsuccessful FiTs from around the world, we were able to identify core principles that more successful FiTs had in common and less successful FiTs lacked. The core principles will provide the framework for the model criteria to be established by the FCB, and the backdrop against which the FCB’s certifying arm will ultimately judge programs. While the core principles are each important in their own way, they will be uniquely applied to each jurisdiction reviewed by the FCB’s certifying arm considering the current status of the jurisdiction’s RE generation efforts, its economy, its laws, political factors, geographical characteristics, and economic landscape—especially regarding cost of RE deployment. International experience shows that the more of these core principles are in place, the more likely the FiT will encourage RE deployment.

A successful FiT program should incorporate a combination of the following core principles: simple administrative process; priority purchase obligation; long payment terms; rate differentiation; properly set rates; conformance to the Public Utility Regulatory Policies Act of 1978 (PURPA); grid connection guarantee; transparency; built-in termination date; absence of caps; and certainty. We discuss each of these principles in more detail below. In distilled form, these core principles amount to FiTs that are predictable in the long-run to all concerned parties, that differ depending on what the targeted renewable generator is

types in the service territories of two major investor owned utilities. COUTURE ET AL., *supra* note 20, at 67. See also RICKERSON ET AL., *supra* note 48.

139. For further discussion on “market price referent” see COUTURE & CORY *supra* note 123, at 12.

140. COUTURE & CORY, *supra* note 123, at 12.

141. Act of Mar. 18, 2010, ch. 78, 2010 Or. Laws 1 Spec. Sess., sec. 2, §757.365(1).

and where it is located, and that provide just enough return on investment to make RE projects financially viable and easy to finance.¹⁴²

Simple administrative process: One of the most important principles to be incorporated into a successful FiT program is a simple administrative process because overwrought administrative processes are one of the highest, but most easily prevented, hurdles facing RE deployment in the United States.¹⁴³ For example, the licensing process for utility-scale offshore wind and solar projects involves numerous agencies, difficult applications, and unnecessarily complicated environmental review procedures.¹⁴⁴ Small-scale and residential projects, such as home photovoltaic units, can also require cumbersome paperwork, such as applications for rebate programs, net metering, and, in certain cases, grid connection.¹⁴⁵ Simplifying these processes will not be easy in the United States, but, of all the core principles, achieving this objective could have the farthest impact in terms of saving public and private money and lowering the barriers to RE development. The FCB could create a model ad-

142. Paul Gipe, *Model Advanced Renewable Tariff Legislation: Designing Model Legislation for a System of Feed-in Tariffs*, WIND-WORKS.ORG (Sept. 15, 2009), <http://www.wind-works.org/FeedLaws/USA/Model/ModelAdvancedRenewableTariffLegislation.html> (last visited Feb. 26, 2012); see also *What Should Be in a Good FIT Law?*, FUTUREPOLICY.ORG, <http://www.futurepolicy.org/2487.html> (last visited Dec. 28, 2010).

143. See, e.g., Larry Greenemeier, *Turning the Tide on Harnessing the Ocean's Abundant Energy*, SCIENTIFIC AM. (Oct. 20, 2008), <http://www.scientificamerican.com/article.cfm?id=ocean-wave-tidal-power>. The article describes the administrative obstacles Verdant Power, Inc., has faced trying to install a kinetic hydropower project in the East River. Verdant spent four years securing necessary permits from the New York State Department of Environmental Conservation and the U.S. Army Corps of Engineers. Verdant has also spent at least \$3 million on environmental impact studies. *Id.*

144. The Cape Wind and WaveConnect projects exemplify the regulatory hurdles and burdens posed by stakeholder opposition. See, e.g., Jay Lindsey, *Cape Wind Energy Seeks a Buyer Amid Controversy*, HUFFINGTON POST (Dec. 19, 2010), http://www.huffingtonpost.com/2010/12/20/wanted-buyer-for-controve_n_799082.html; Katharine Q. Seelye, *Regulators Approve First Offshore Wind Farm in U.S.*, N.Y. TIMES (Apr. 28, 2010), <http://www.nytimes.com/2010/04/29/us/29wind.html>; Bryan Walsh, *Offshore Wind Power: Is It Worth the Trade-offs?*, TIME (Apr. 28, 2010), <http://www.time.com/time/health/article/0,8599,1985613,00.html>; Susan Kraemer, *PG&E to Try Next Round of Wave Power Tests off Santa Barbara Coast*, SCIENTIFIC AM. (Dec. 12, 2009), <http://www.scientificamerican.com/article.cfm?id=pgande-to-try-next-round-of-wave-po-2009-12>. See also *RPS Project Permitting Barriers*, CPUC, <http://www.cpuc.ca.gov/PUC/energy/Renewables/permittingbarriers.htm> (last updated Jan. 20, 2009).

145. "Government permitting for residential solar installation [in California] accounts for approximately five to 20 percent of total installation cost (depending on the size and complexity of the solar installation), or approximately \$2,500 per solar installation." Alexander Quinn et al., *Economic and Fiscal Impact Analysis of Residential Solar Permitting Reform, Executive Summary*, AECOM 6 (July 2011), http://www.sunrunhome.com/uploads/media_items/aecom-executive-summary.original.pdf.

ministrative procedure and forms that different jurisdictions could readily adopt. To the extent a jurisdiction's bureaucracy strays too far from the FCB model, the FCB could comment on that and ultimately threaten to remove or withhold its approval of the program if the discrepancy is too great.

Priority purchase obligation: Requiring a priority purchase obligation for utility companies would offset fossil-fuel pollution, which is the primary benefit of RE. The priority purchase obligation would obligate wholesale power purchasers (e.g., grid operators and utilities) to buy RE ahead of fossil-fuel electricity. The amount of RE the utility would have to buy depends on how much RE is generated at any given time of day, without there being any pre-determined requisite amount to purchase. The obligation gives security to investors backing RE projects because there is a guarantee that the electricity they produce will be purchased.

Long payment terms: Long payment terms are important because building RE is capital intensive and it can take at least a decade to recoup the initial investment, financing, and a profit in a way that does not overburden the consumers who are ultimately being charged for it. Long payment terms are fixed contract prices that run for between 15 and 25 years.¹⁴⁶ Two benefits arise from long payment terms: they limit the overall cost of the FiT system and they guarantee investment security.¹⁴⁷

Differentiated: The rates at which utilities purchase RE power should be differentiated because RE generators are not homogenous. RE generator projects come in different sizes, use different technologies, are sited on parcels ranging from industrial to residential, and have access to different resource intensities.¹⁴⁸ What utilities pay to these generators ought to reflect these differences in material, labor, and capital inputs. However, rate differentiation should not sacrifice simplicity and uniform application for RE generation.

Rates: The rates at which utilities may purchase the RE power need to be carefully set. FiTs work most effectively when rates are set at the cost of power production (based on the differentiation just described), plus a reasonable profit.¹⁴⁹ Rates that scale down over time in steps or phases (degressive rates) are also essential to drive RE production costs down, which ultimately would allow RE-generated electricity to become competitive with conventionally fueled electricity.¹⁵⁰ Reasonable profits should not be set either too high, lest they lead to windfall profits and

146. COUTURE ET AL., *supra* note 20, at 72.

147. COUTURE ET AL., *supra* note 20, at viii.

148. COUTURE ET AL., *supra* note 20, at 4.2.1.

149. COUTURE ET AL., *supra* note 20, at viii.

150. COUTURE ET AL., *supra* note 20, at 4.2.2.1.

excessive supply, or too low, thus failing to encourage sufficient RE deployment.¹⁵¹ The steep recent drop in solar panel prices is evidence of the effects of depressive rates, as much of this drop can be attributed to demand for solar panels created by FiT programs in such countries as Germany and Italy.¹⁵² The FCB could establish a formula that would help jurisdictions identify ways to balance how they set their rates, with the understanding that the formula needs to be flexible enough to account for local factors like prevailing electricity prices, market demand, and so on.

Conform to PURPA: Any FiT in the United States needs to conform to PURPA. This core principle admittedly is specific to the United States, and so has no international precedent. It is also non-negotiable because failure to comply with PURPA could open an FiT to unnecessary legal challenges.¹⁵³ PURPA requires utilities to purchase electricity from “qualifying facilities” at the utilities’ “avoided costs.”¹⁵⁴ There are two types of “qualifying facilities”: (1) “small power producers” cannot have a rated capacity (i.e., ability to produce electricity) above 80 megawatts, and must obtain at least 75 percent of their input energy from renewable sources; and (2) renewable-based co-generators.¹⁵⁵ “Avoided costs” is what a utility would have had to expend if it had generated the power or purchased the power from any power producer other than the qualifying facility.¹⁵⁶ In simplistic terms, PURPA requires a utility to pay small-scale renewable power producers the amount it would have paid had it generated the power itself or bought the power from less expensive sources.¹⁵⁷

151. See Paul Voosen, *Spain’s Solar Market Crash Offers a Cautionary Tale About Feed-In Tariffs*, N.Y. TIMES, Aug. 18, 2009, <http://www.nytimes.com/gwire/2009/08/18/18green-wire-spains-solar-market-crash-offers-a-cautionary-88308.html> (discussing how Spain priced its solar tariffs too high, causing a glut of applicants due to the excess profits, hence causing major disruption to Spain’s FiT program).

152. See, e.g., ERNST & YOUNG, UK SOLAR PV INDUSTRY OUTLOOK: THE UK 50kW TO 5MW SOLAR PV MARKET, 12 (June 2011), available at <http://www.oursolarfuture.org.uk/wp-content/uploads/The-UK-50kW-to-5-MW-solar-PV-market-190611-Final.pdf> (predicting that solar costs will be on parity with fossil fueled-based power costs in the UK by 2020); see also Kevin Bullis, *Suntech Stresses R&D: China’s Solar Giant Shifts Its Strategy*, TECH. REVIEW (Apr. 9, 2010), available at <http://www.technologyreview.com/business/25016/> (last visited July 7, 2011) (describing how FiTs ramped up demand for solar panels, subsequently causing numerous new panel manufacturers to enter the market, ultimately leading to an over-supply and a drop in the price of solar panels).

153. See Jennifer Gleason, *Adopting State Feed-in Tariff Laws Without Federal Preemption*, ENVTL. LAW ALLIANCE WORLDWIDE, 2–3 (Aug. 10, 2011), available at <http://www.elaw.org/system/files/fed.preemption.aug2011.pdf>.

154. 18 C.F.R. §§ 292.101(1), (6) (2011); 18 C.F.R. § 292.304 (2010).

155. See 16 U.S.C. § 824a-3(a) (2006); 18 C.F.R. §§ 292.203, 292.204 (2011).

156. 18 C.F.R. § 292.101(b)(6) (2011).

157. See, e.g., Gleason, *supra* note 153, at 2–3.

In an important milestone for states' rights to implement FiTs, FERC approved setting different levels of avoided costs according to the targeted resource, which is important if a FiT is going to differentiate as described above.¹⁵⁸ Indeed, recent FERC developments bode positive since FERC appears to be easing conditions for states to develop FiT programs. FERC recently ruled that the pricing scheme under California's FiT program is acceptable as "avoided costs" under PURPA.¹⁵⁹ Via this 2010 order, FERC approved differentiated pricing based upon resource, thus opening the door for the approval of more robust FiTs in the future. A nonprofit certifying board like the FCB could help states and municipalities ensure that the FiTs they create are in conformance with the requirements of PURPA, as well as the Federal Power Act,¹⁶⁰ and thus help achieve the ultimate goal of increasing RE capacity in the United States through well-designed FiTs.

As a result, to be legal in the United States, FiTs must carefully specify and define the avoided costs. Because PURPA determinations are within FERC's jurisdiction, the role of the FCB would be limited to staying on top of the developments in this arcane area to keep informing interested parties of how the law evolves.

Guarantee connection to the electricity grid: RE generators need to have a guarantee that they can connect to the electricity grid. RE generators need to be able to connect to the grid so that they can deliver any excess electricity they generate to utilities. Regional Transmission Organizations (RTO) and Independent System Operators (ISO) operate grids in the United States.¹⁶¹ RE electricity can come from sources as varied as large-scale industrial solar thermal units to residential windmills.¹⁶² RTOs and ISOs must be obliged to guarantee all RE generators equal

158. See Order Granting Clarification and Dismissing Rehearing, 133 FERC ¶ 61,059 (Fed. Energy Regulatory Comm'n, Oct. 21, 2010); *but see* Order Granting Application to Terminate Purchase Obligation, 135 F.E.R.C. ¶ 61,247 (Fed. Energy Regulatory Comm'n, June 16, 2011) (approving a settlement between certain investor-owned utilities - or IOUs - and energy producers in California whereby the IOUs would be exempt from the requirement under PURPA to purchase RE-produced power from certain qualifying facilities. While significant, this order does not invalidate FERC's earlier order paving the way for the establishment of differentiated avoided costs).

159. See Discussion on PURPA and "avoided costs," *supra* note 53; *FERC Clarifies California Feed-in Tariff Procedures*, FERC, (Oct. 21, 2010), available at <http://www.ferc.gov/media/news-releases/2010/2010-4/10-21-10-E-2.pdf>.

160. 16 U.S.C. §§ 824(d), 824(e) (2006).

161. See *Electric Power Industry Overview*, U.S. ENERGY INFO. ADMIN., 2007, <http://www.eia.doe.gov/cneaf/electricity/page/prim2/toc2.html> (last visited Dec. 30, 2010).

162. See *Renewable Energy Consumption and Electricity Preliminary Statistics 2010*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/renewable/annual/preliminary> (last visited Feb. 26, 2012).

access to connect to the grid so as to avoid any inequity, as well as to encourage that a variety of RE generators are built. Lawmakers should require this guarantee in the FiT law because it creates confidence for the RE project developers as well as their financial backers. Without a connection guarantee, the developer and investors will not know that the electricity they generate can be delivered or paid for. The requirement should be written simply and applied uniformly.

Transparency: Transparency of information is paramount for FiTs to gain credibility among generators, investors, and the public alike. RE generators need to have reliable information about such things as grid capacity and the cost of connection so that they can determine with their investors whether it is economically feasible for them to proceed with project development or add to existing generating capacity. Grid operators and retail utilities should provide the same information to all generators regardless of their size or fuel source to avoid inequitable treatment of generators. With transparent information the public can track the difference between certain input costs for RE generation versus how much they are paying for the delivered product. The FCB could leverage its certification on whether information transparency meets its standards.

Terminating date: Rates under FiTs should have a terminating date. When rates under a FiT are originally established, they should include a date at which legislatures review the rates to determine if they should terminate them.¹⁶³ Such sunset clauses create an incentive for RE developers to know that the FiT guarantee is not likely to be ongoing and therefore they should take advantage of the subsidy early. After creating an early incentive for RE developers to begin projects, the incentive should continually reduce each year until it disappears altogether. However, if a particular FiT's timeline was initially set too short, then the sunset clause will allow the legislators to make that determination and adjust accordingly.

Not limit or cap: FiTs should not limit or cap how many megawatts from RE generation can be generated. Direct caps, which are upper limits on the number of megawatts participating in the program, may have some usefulness, but we believe they can also unintentionally impede the potential benefit of an otherwise well-designed FiT.¹⁶⁴ FiTs should ideally have no caps, but if caps are going to exist they should be sufficiently high to provide the wide-scale benefits of the FiT.

Certainty: RE generators need to have certainty that the FiT will continue as described when passed into law. Recent experience in the

163. THE OXFORD COMPANION TO GLOBAL CHANGE 446 (David J. Cuff & Andrew S. Goudie eds., 2009).

164. See COUTURE ET AL., *supra* note 20, at 90.

United Kingdom shows how fickle governments can be in terms of honoring FiTs.¹⁶⁵ Governments should not act contrary to the law, nor to promises they make and which investors depend on.¹⁶⁶ Rather, they should continue the FiT program and rate schedule they initially set out. Such certainty is partly reflected in the length of payments, but also in the degressive rates and who qualifies for the programs; none of these factors should be changed between enactment and expiration of the law. If they do change, RE generators and their investors may lose confidence in the program. Even worse, these parties might lose capital they invested on the basis of what the legislators initially promised in the FiT. Thus, all FiT schemes need to have the same continuity and certainty accorded to any law established in a democratic system.

The optimal mixture of principles will depend on local needs and conditions. Only local jurisdictions truly know those needs and conditions. But local government agencies may not have the experience or expertise to know how to optimally establish a FiT for their needs. For instance, when the city of Los Angeles recently envisioned a FiT, it contracted with the Los Angeles Business Council to perform an analysis and provide recommendations.¹⁶⁷ Similarly, we believe the FCB can help to fashion FiTs for various jurisdictions and is an appropriate vehicle to determine whether a proposed FiT program has a sufficient and balanced presence of core principles. Indeed, the presence or absence of core principles has led to the success or failure of FiT programs worldwide.¹⁶⁸

IV. CONCLUSION

With the correct mixture of core principles, we believe FiT programs can thrive. They will thrive because a well-designed FiT gives investors the certainty they crave which in turn gives project developers

165. Kiran Stacey, *UK reduces subsidies for large-scale solar UPDATED*, FIN. TIMES, (Mar. 18, 2011, 12:04 PM), <http://blogs.ft.com/energy-source/2011/03/18/uk-reduces-subsidies-for-large-scale-solar>.

166. See David Blair, *Power Chief Hits Out At Nuclear Boost*, FIN. TIMES (June 1, 2011, 12:01 AM), <http://www.ft.com/intl/cms/s/0/6b24f8ae-8bb0-11e0-a725-00144feab49a.html#axzz1OezZe700> (regarding feed-in tariff programs in the United Kingdom, "Mr. Marchant [chief executive of Scottish and Southern Energy] said the government should give companies the certainty needed for big investment decisions").

167. See LOS ANGELES BUSINESS COUNCIL (LABC) & UCLA LUSKIN CENTER FOR INNOVATION, BRINGING SOLAR ENERGY INTO LOS ANGELES: AN ASSESSMENT OF THE FEASIBILITY AND IMPACTS OF AN IN-BASIN SOLAR FEED-IN TARIFF PROGRAM 1 (2010), available at <http://luskin.ucla.edu/sites/default/files/Bringing%20Solar%20to%20Los%20Angeles.pdf>

168. See discussion, *supra* at 59.

the outside investment they sorely need.¹⁶⁹ Indeed, two prominent academics in the field of RE, Mark Delucchi of the University of California at Davis and Mark Jacobson of Stanford University, noted that, “[a] recent survey of venture capitalists investing in RE technologies found that the investors ranked FiTs as the most effective policy for stimulating the market for RE.”¹⁷⁰ As a result, FiTs are not only a good idea, but may be the strongest mechanism to spur RE deployment on a sufficiently large scale to meet growing energy demand.

Rolling out successful FiTs around the nation will allow U.S. companies to capitalize on two attributes: (1) the United States has the manufacturing capability—it is home to First Solar, the world’s largest solar manufacturer,¹⁷¹ and (2) the United States has abundant and varied RE sources. Hot, long days in the Southwest mean that a one kilowatt solar electric system in Arizona can produce 2,100 kilowatt-hours per year, versus the same system in Germany which can only produce 1,200 kilowatt-hours per year.¹⁷²

But first the FiTs need to be designed with the necessary characteristics to encourage RE deployment. Having a FCB certify these FiTs will create confidence in, and increase the likelihood of success of, the programs. The results will benefit U.S. companies, citizens, competitiveness, and the environment.

169. See generally MARK A. DELUCCHI & MARK Z. JACOBSON, PROVIDING ALL GLOBAL ENERGY WITH WIND, WATER, AND SOLAR POWER, PART II: RELIABILITY, SYSTEM AND TRANSMISSION COSTS, AND POLICIES, 39 ENERGY POLICY 1170 (Mar. 2011).

170. *Id.* at 1177.

171. See *Innovation: Rapid Deployment Holds the Key for World’s Largest Solar Manufacturer*, NREL (2010), <http://www.nrel.gov/innovation/pdfs/48861.pdf>.

172. SUSAN COMBS, TEX. COMPTROLLER OF PUB. ACCOUNTS, THE ENERGY REPORT 2008, 147–48 (2008) (citing PROMETHEUS INST., U.S. SOLAR INDUSTRY YEAR IN REVIEW 3 (2006)), available at <http://www.window.texas.gov/specialrpt/energy/pdf/96-1266EnergyReport.pdf>.

