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*by Ursula Kazarian**

Introduction

"Clean tech" developments are widely recognized as critical to the fight against climate change. However, putting climate change rhetoric into action has often proven both complex and controversial. One clear global necessity is the transformation of energy production from a hydrocarbon-based paradigm to one comprised of "clean" energy that emits little or no greenhouse gases ("GHGs"). One of the most pressing elements of the realization of this transformation is power production and transmission project funding. The burgeoning field of renewable energy finance is rife with experimental finance options. Although the recently passed American Recovery and Reinvestment Act ("ARRA") provides $4.5 billion to update the U.S. electricity grid and another $16.8 billion for broad energy efficiency and renewable energy ("RE") measures,[1] the bulk of the costs of bringing new energy sources online necessitate a more sustainable finance structure. Net metering programs, the voluntary U.S. cap-and-trade market, and, most recently, feed-in tariffs, have become central to the debate in finding—and funding—a way toward a greener energy infrastructure in the United States. This Article briefly surveys current finance options for RE to supply the main electrical grid and examines current U.S. legislative trends aimed at meeting national goals in an international context to combat climate change through the increased implementation of RE generation and distribution as part of a new national "smart grid."

The transition to clean energy in the United States has inched its way forward through the incremental establishment of regulations.

The transition to clean energy in the United States has inched its way forward through the incremental establishment of regulations encouraging state-level Renewable Portfolio Standards ("RPS") and tax incentives for RE production. Particularly in light of the Obama administration's call for a nationwide renovation of the energy grid, a clearly-defined and uniform finance structure has never been more appropriate or necessary. The market for renewable energy was effectively launched in 1978 by the Public Utility Regulatory Policy Act, which mandated that utilities purchase energy from "qualifying facilities" such as cogeneration plants and small power production plants at "avoided cost" rates that were often above market prices.[2] Since then, state-level legislative development regarding renewable energy production has been widely varied, with some states embracing progressive energy programs more than others.[3] Perhaps as a consequence of the somewhat scattered and spasmodic policy development across the country, implementation methods are also diverse, not the least of which are the financial mechanisms that fund RE development.

While the Energy Policy Act of 2005 ("EPACT2005")[4] extended existing tax incentives[5] to encourage the integration of RE production within state-level Renewable Portfolio Standards, no federal legislation has yet mandated a specific financial mechanism to implement clean technology in the energy sector, leaving states to construct their own solutions. However, it is widely anticipated that the Obama administration will continue its stated goals to develop a national "smart grid"—a nationally interconnected network of electricity generation and transmission lines, updated with the latest digital technology for optimal efficiency and cost savings. Such a broad new regulatory plan would necessarily include finance options as a primary consideration, and the political trend appears to be moving toward cost allocation systems that spread the costs of new electricity generation and distribution to ratepayers. However, the specific cost allocation structure continues to be a topic ripe for discussion.

The GHG emissions reduction rhetoric offered over the last several years by the Bush administration largely relied on "voluntary" market measures that presupposed an inclination of private operations to contribute to the implementation of clean technologies, including RE production. The dearth in domestic implementation mirrored the disinterest in international involvement in forming mandatory regulations. Consequently, the United States currently lags behind the rest of the industrialized world in the development of RE production. The new direction of the Obama administration effectively reverses the position of the federal government both internationally and domestically and gives new hope to the development of national-level legislation to regulate the transition to a clean and modern energy infrastructure.

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Market Mechanisms for U.S. Clean Tech Implementation

A variety of market mechanisms have been developed over the past few decades to encourage green technology through economic benefit. Compulsory cap-and-trade programs such as the European Emissions Trading Scheme ("EU ETS") that promote the reduction of GHGs through emissions credits have enjoyed some success among polluting businesses.[6] However, in the United States, such options have not yet been made mandatory. Despite the popularity of emissions trading worldwide, criticism has been directed at the tendency to "shift" the emissions and reward the heaviest polluters rather than actually reduce total emissions.[7] Conversely, proponents argue that the overall reductions target can be reduced on a set schedule over a period of years, effectively creating a positive market mechanism while tackling global warming.[8] In any case, emissions trading will likely continue to be used as a means of reducing GHG emissions in an economically appealing way for emitters.

In addition to emissions trading, which takes a system-wide approach to reducing overall existing emissions, rather than directly mandating the replacement of GHGs with clean energy production, other mechanisms have been developed in an attempt to create a more individual approach to encouraging RE generation. Net metering, which was introduced by EPACT2005 and which requires all public utilities to be offered to consumers upon request, encourages homeowners and small electricity generators by providing retail credits for on-site RE generation.[9] Thus, net metering has become recognized as a reliable way to reward small-scale RE production. However, the demand for a dramatic increase in RE production encourages the creation and integration of other clean tech policies.

Another financial mechanism, variations of which have been adopted throughout most of the EU and introduced for discussion throughout the world to boost the installation and transmission of RE, has been the feed-in tariff ("FIT").[10] While there are several structural variations, the German model has been used to construct other FITs throughout Europe. The German model requires utilities to pay a fixed premium price to small renewable energy producers and homeowners for the clean energy they contribute to the grid. The price is sector-specific and based on the cost of production. The FIT policy is credited with the dramatic growth in renewable energy resources in Germany, which is now the world's largest market for photovoltaic and wind energy. Spain, having adopted a similar FIT policy, has also seen explosive growth in the renewable energy sector. The German model has since been applied in many countries throughout Europe as well as in Canada, so far largely successfully.[11] Other adaptations of FIT policy have been adopted in China, Thailand, and parts of India.[12]

Perhaps not surprisingly, the European Commission found in 2005 that FITs were a highly effective finance mechanism to promote new RE production.[13] Echoing this and referencing the European model, the World Future Council's ("WFC") Policy Action Climate Toolkit Project has suggested that feed-in tariffs are the most promising finance mechanism to promote RE generation worldwide.[14] Accordingly, a WFC-funded report supports the idea of a U.S. national feed-in tariff to expedite the transition to a clean energy infrastructure.[15]

Despite the success of FITs throughout the world, the United States has not yet adopted a national strategy to finance the shift to a clean energy economy. However, several states have begun to consider FIT policies, in many cases to complement existing RPS requirements that focus on percentage-oriented reduction targets.[16] As is so often the case in the environmental field, California has led the way in the United States for developing feed-in tariff legislation for renewable energy projects. Assembly Bill 1969 of 2006[17] established feed-in tariff systems that offered the same price for all technologies but varied from Germany's system in that the determining factor is whether the energy is delivered during peak hours, rather than the cost of generation per technology. To date, no other state has passed legislation requiring any form of feed-in tariff; however, the city of Gainesville, Florida launched a feed-in tariff system similar to that of Germany and Spain in March 2009 and is already reporting economic success through its implementation.[18] Several other states, including Illinois, Minnesota, and Rhode Island, are considering or have introduced similar bills. In 2008, U.S. House Representative Jay Inslee introduced legislation for a national-level FIT that also included the basic uniform minimum standards;[19] although the bill did not pass, it perhaps helped to set the scene for legislation to come. Especially given the new national push to implement green policies, it is quite possible that a federal feed-in tariff bill will pass relatively soon, despite the fact that some political opposition is expected in many states.[20]

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The Role of the Coming "Smart Grid" Technology in Increasing Energy Efficiency and Boosting Cost Savings

The idea of an electrical "smart grid" focuses on reliability, efficiency, and safety. However, it is generally accepted that a longer-term strategy should include RE as the energy source to power a smart grid. According to a recent report from the Center for American Progress ("CAP"):

> Federal incentives for new renewable energy transmission projects should be strengthened—through accelerated depreciation schedules, increasing Private Activity Bond authority for states, or other federal tax incentives—directly

involving taxpayers in the fulfillment of the clean-energy, reliability, and national-security benefits of an updated grid. Smart distribution investments warrant public investment due to their broad public benefits. While in most cases transmission projects will be financed by the private sector, some lines will also need public financing or incentives to ensure they are built.[21]

CAP thus argues that updating the electricity grid is a matter of national security as well as environmentally sound policy, and as such it is reasonable to increase public funding of relevant projects. Policy trends across the states seem to reflect a similar perspective, resulting in a myriad of implementation mechanisms to push forward progressive energy policies. CAP further suggests that it may be procedurally more prudent to spread the costs of a group of new electricity generation projects to all ratepayers, rather than take the more specific but more complicated approach of directing project-specific costs to ratepayers according to load-specific consumption in addition to an assumed taxpayer contribution—in effect creating a uniform FIT.[22]

Along the same vein, a federal legislative proposal to build a national smart grid is now being considered. In March 2009, Senate Majority Leader Harry Reid introduced the Clean Renewable Energy and Economic Development Act, which requires the construction of a smart grid based on reliable transmission fed by RE generation through the designation of "renewable energy zones" that will integrate RE into the mainstream electrical transmission grid.[23] The bill also provides that the cost recovery plan will include a federal surcharge[24] in addition to cost recovery plans submitted by regional planning entities.[25] Given the current state-level push for FITs, it is quite possible that the cost allocation plans submitted by regional planning entities could incorporate such policies, even if no national mandatory standard for FITs is implemented. The bill has been referred to the Committee on Energy and Natural Resources. The timing is well planned. The Obama administration's recent endorsement for a national smart grid makes the creation of a national standard to increase the integration of RE production and transmission likely. The Department of Energy has already collected a number of documents and reports concerning the development of a smart grid, and seems poised to implement any relevant legislation that may be passed.[26]

Conclusion

The new direction of the Obama administration gives hope to several concurrent initiatives integrating digital technology, green energy, and economic benefit to RE generators. The need for such progressive policy is increasingly recognized as critical to national security and energy reliability and is more urgent than ever in the larger fight against global climate change. Thus far, the United States has developed RE technology in a patchwork fashion, with some states taking the legislative lead while others are doing little to nothing to integrate RE, despite incremental federal-level encouragement. The passage of the legislation such as that recently introduced in the U.S. Senate to create a national, "green" smart grid will create a uniform national standard for RE generation and distribution as well as the cost recovery mechanisms so critical to implementation.

The timing for such policy harmonization could not be better. The UN Conference on Climate Change meeting in Copenhagen in December 2009, where the follow-up framework to the Kyoto Protocol is expected to be drafted, will address the finance implementation strategy of energy projects among other critical facets of a climate change mitigation strategy. UN climate chief, Yvo de Boer, has cited numerous challenges to financing new RE production, including the current economic crisis.[27] Thus, in order to push forward with the fight against global warming and climate change, establishing uniform financial mechanisms to facilitate domestic level realization of the international goals set forth by Kyoto and its successor will remain paramount in the policy formation process at all levels of implementation.

Endnotes: Evolving U.S. Clean Tech: Legislative Trends

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10 Renewable Energy Policy Network for the 21st Century [REN21], Global Status Report 23 (2006) [hereinafter REN21], *available at* http://www.ren21.net/pdf/RE_GSR_2006_Update.pdf (showing a list of all countries enacting feed-in tariff legislation).

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[15] POLICY UPDATE, *supra* note 3, at 13, 16.

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