RECOMMENDATIONS FOR FEED-IN-TARIFF PROGRAM IMPLEMENTATION IN THE SOUTHEAST REGION TO ACCELERATE RENEWABLE ENERGY DEVELOPMENT

Southern Alliance for Clean Energy

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Recommendations and Findings

The Southeast possesses a variety of renewable energy resources, including biomass, solar and wind. Yet development of these resources is at a crawl in the Southeast. That's because the Southeastern states, with the exception of North Carolina, have not implemented comprehensive renewable energy policies – and North Carolina's policies will take several years to have an impact. This report highlights three opportunities to use feed-in tariff (FIT) policies in the Southeast. In each instance, a FIT policy is well-suited to support the rapid deployment of renewable energy resources in the region.

The FIT program experience has produced various designs for programs labeled as "feed-in tariffs." In Europe and Ontario, for example, the FIT program is designed to provide an administratively-set fixed long term payment for power at a value intended to represent generation cost plus a rate of return. In the U.S., only Gainesville Regional Utilities (GRU) and Vermont utilize this "generation cost-based" FIT program design. Other U.S. states and municipalities have adopted variously designed FIT programs based on administratively set values other than generation cost. California is utilizing an auction, rather than the administrative approach, to set the FIT price for projects from 1 to 20 megawatts (MW). Also, most U.S. FIT programs only provide a payment for power delivered to the transmission or distribution grid, while one program also provides a FIT payment for power consumed onsite.

Given the wide breadth of FIT program designs and other pricing-structure based policies used in the U.S.; this report takes an expansive view in defining a FIT program. The minimum criteria include the following:

- The utility is obligated to enter into long-term standard offer contracts with renewable energy generators. A standard offer is an offer by an electric utility generator or distributor to enter into a contract with eligible renewable energy generators that provides a transparent and non-negotiable price and terms;

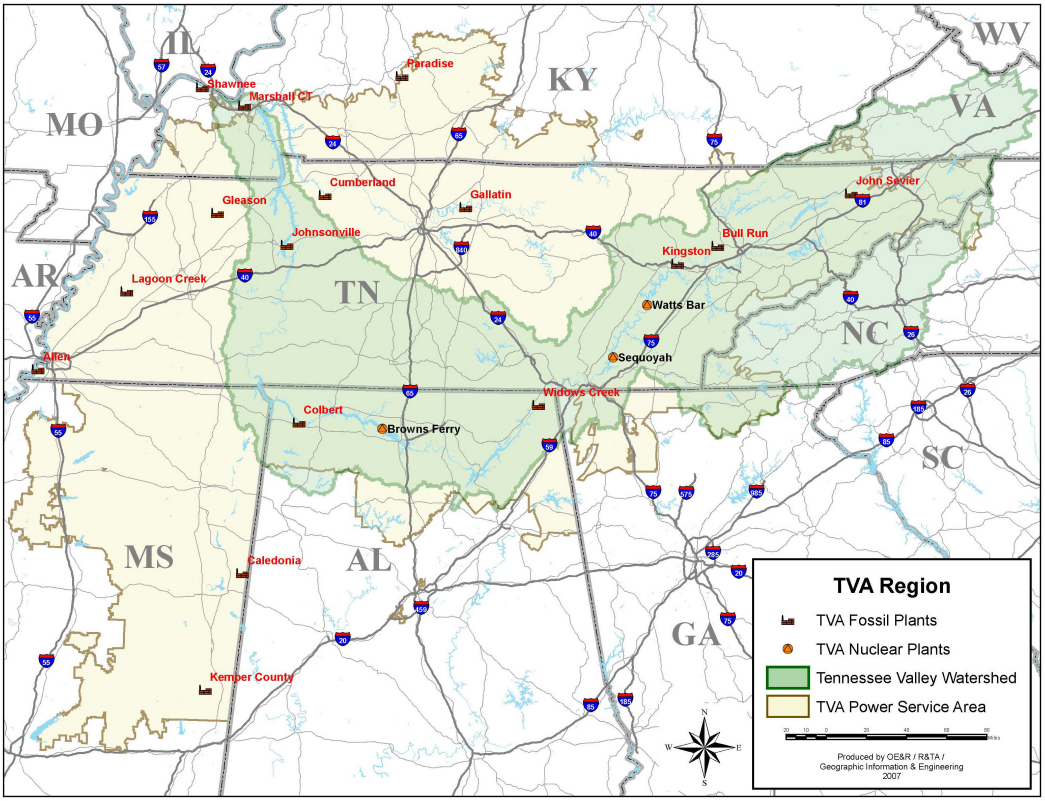
- The renewable energy generator receives a guaranteed payment from the utility for the system's actual production for the entire term of the contract, which is fed into the distribution or transmission system and may include energy consumed onsite. The rate structure is set in an administrative process on the estimated cost of generation (plus a rate of return), or set by an auction process, or some other value;

- Rates may be differentiated based on a host of factors, including but not limited to technology type and project size.

The prevailing utility structures in the Southeast region are vertically integrated investor-owned utilities (IOU), government-owned utilities, such as the Tennessee Valley

Authority (TVA) that reaches into seven states, with municipal utilities and electric cooperatives dispersed throughout the region.[1]

TVA service territory map



Recommendations

The three recommended policies focus on government-owned utilities. TVA and municipal utilities are not subject to Federal Energy Regulatory Commission (FERC) jurisdiction over wholesale power purchases.[2] Therefore, government-owned utility FIT programs provide near term solutions because they can be implemented without changes to state statute to avoid federal preemption. The specific recommendations are listed below in order of largest to smallest impacts.

[1] Electric cooperatives should be distinguished from municipal utilities. A municipal utility is a provider of electricity services owned and operated by a governmental entity. Municipal utilities are exempt from Federal Energy Regulatory Commission (FERC) jurisdiction for wholesale power purchases. An electric cooperative is owned by the members it serves, and provides at-cost electric service to its members. Each cooperative is governed by a board of cooperative members that is elected by the membership. Electric cooperatives that receives financing from the Rural Electrification Act and generate less than 4 million megawatt hours (MWH) annually are also exempt from FERC jurisdiction over whole sale power purchases. *See* www.ferc.gov/eventcalendar/Files/20051015140811-ER05-1381-000.pdf

[2] The Federal Power Act (FPA) makes it unlawful to make a sale of electricity at wholesale without proving to the Federal Energy Regulatory Commission (FERC) that the price is just and reasonable.

- Modify the recently announced TVA Renewable Standard Offer (RSO) program with changes that include increased funding and a RAM procurement system. The current project size cap of the TVA RSO program is 201 kilowatts (kW) to 20 MW with a program cap of 100MW (Option 5).

- Increased funding of the existing TVA Generation Partners (GP) program because it has already shown success in developing small scale renewable projects. The program has thus far created 500 projects totaling about 60 MW.[3] The current project size cap is 200 kW with a program funding cap of $50 million (Option 6).

- Accelerated implementation of FIT programs by municipal utilities to encourage the rapid deployment of small scale solar photovoltaic (PV) projects. Such programs could be implemented relatively quickly and prices can be administratively set at generation cost or some other value (Option 7).

Investor owned utilities generate most of the power in the Southeast region and thus hold the largest potential for renewable energy development from a FIT policy. In the short term, several challenges remain to IOU FIT programs which include: 1) existing law (Appendix E); 2) historical FERC regulatory policy; and 3) the regional politic landscape that is averse to regulatory mandates (Appendix C). If one of those barriers were to fall, the probability for implementing an IOU FIT program in the Southeast would increase dramatically.

For instance, a recent FERC order may ultimately change the need for a funding source for a state-wide FIT program thereby eliminating the need for significant state statutory changes for such programs. IOU FIT programs must currently have a funding source if the FIT offer price is above the utility's "avoided cost" to circumvent federal preemption.[4] The utility's avoided cost can be defined as the cost to the utility of the next incremental unit of electricity – a price point currently too low in the Southeast for meaningful renewable energy development. The FERC order appears to allow state's to utilize multi-tiered avoided cost structure depending on the type of generation resource that is being "avoided" by the purchase of power from different renewable energy technologies.[5] Therefore, state utility commissions could have the leeway to set more attractive avoided cost rates for the procurement of renewable energy from renewable energy owners. This is a quickly evolving area of regulation that warrants monitoring and holds the potential for IOU FIT program advocacy in the Southeast region.

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[3] Communication with Susan Curtis, TVA Senior Project Manager for Generation Partners, October 2010. .

[4] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 14, January 2010. The funding source can be a Public Benefit Fund (PBF), tax credit, or Renewable Energy Credit (REC).

[5] FERC Order 134 FERC ¶ 61,044, January 20, 2011 ("[b]ecause avoided cost rates are defined in terms of costs that an electric utility avoids by purchasing capacity from a QF, and because a state may determine what particular capacity is being avoided, the state may rely on the cost of such avoided capacity to determine the avoided cost rate. Thus, the avoided cost rate may take into account the cost of electric energy from the generators being avoided, e.g., generators with certain characteristics.").

Background: RPS and FIT Programs

The pursuit of production-based incentive policies that promote the development of renewable energy resources has primarily taken two distinctive policy tracks: the FIT, mainly outside U.S. borders; and the RPS in the U.S.[6]

The most important element of FIT policy design is the expectation of a reliable, long-term revenue stream for the investor. The rapid development of renewable energy in Germany and the fully subscribed program in the City of Gainesville are often cited as successful examples of FIT programs. Investor interest to these programs has been high because they provide payments that are certain and set in a transparent fashion that traditionally covered the cost of renewable energy generation with a stipulated return on investment.[7]

Investor enthusiasm over the certainty provided by FIT programs has, however, likely been tempered by recent Spain's prospective reductions in payments to solar project owners that have previously-executed FIT contracts.[8] It has also been reported that the German government (and possibly other European governments) is considering significant cuts in its tariff rate for future projects.[9]

Despite these recent setbacks, the FIT program has been the primary tool that has driven the growth of the European renewable energy sector. Nineteen European Union (EU) countries and non-EU countries, such as Switzerland, Ukraine and Albania have adopted FIT policies. Some form of FIT policy is found on almost every continent, from Asia and Africa, to Europe and North America.[10]

The other major policy that has driven renewable energy development has been the renewable portfolio standard (RPS), also referred to as a renewable electricity standard (RES). The fundamental difference between RPS and FIT programs is that an RPS prescribes how much renewable energy must be procured or developed by state utilities and lets the market determine the value. The value is represented by the price of RECs. A REC represents the environmental attribute of the energy produced and provides the investor value above purchase of power. In this way, the demand for REC's drives the price of qualifying energy sources, whereas a FIT program sets the price at a level that will drive renewable energy development and generally lets the market determine the level of development.

The RPS has been the primary driver of renewable energy in the United States. Mandated RPS targets have been adopted in 29 states and the District of Columbia.[11] RPS programs

[6] Other production-based incentives, such as net metering, and non-production based incentives, such as tax incentives, rebates and grants, have also been utilized and are discussed more in later sections.
[7] *See* DB Climate Change Advisors, *Paying for Renewable Energy: TLC at the Right Price, Achieving Scale through Efficiency Policy Design,* December 2009.
[8] Eric Rosenbaum, *Solar Grinch: Spain Does the Unthinkable*, The Street, December 28, 2010.
[9] Eric Rosenbaum, *Solar Losers: Decline and German Noise Continues*, The Street, January 28, 2011.
[10] KEMA, *California Feed-in Tariff Design and Policy Options*, p. 15, May 2009.
[11] Wiser & Barbose, *State of the States: Update on RPS Policies and Progress*, p. 6, November 18, 2009.

have been adopted to meet individual state renewable energy development targets, and in some states like California, to assist in meeting state GHG emission reduction goals.

RPS policies have exhibited success in the U.S., especially in developing wind power, which accounts for over 90 percent of RPS-driven renewable energy development.[12] It is important to note, however, that the economics of solar and wind have changed dramatically in recent years, and historical experience may not be predictive of future RPS resource development.[13] RPS programs can utilize cost caps to manage costs, or an alternative compliance payment (ACP). An ACP is a payment made by a utility in lieu of procuring or generating renewable energy, thereby establishing a *de facto* ceiling for the price of renewable power.

Under an RPS, the load serving entity must determine how they will comply with the mandate. Typically, a utility will issue requests for proposals and will select projects that offer the best package of siting, operational expertise, and cost.[14] Over the years, RPS programs are trending towards more certain payment arrangements, such as longer term contracts for RECs in regulated utility markets to provide certainty, and standard offer contracts to provide more transparency. As a result, many of the elements of a FIT can be found in a RPS program. Therefore, it should be possible to incorporate elements of feed-in tariffs into RPS policy making. In fact, some states, such as California, view FIT programs as a mechanism to help them reach RPS targets.[15]

[12] *Id.* at 23.
[13] Solar PV modules have dropped considerably in price in the last decade. In 2001, modules were priced at almost $6 per watt. Today's prices are at approximately $3 per watt, with some below $2 per watt for multicrystalline silicon panels. See Module Pricing, at: http://www.solarbuzz.com/facts-and-figures/retail-price-environment/module-prices.
[14] Cory, et al., *Feed-in Tariff Policy: Design, Implementation, and RPS Policy Interactions*, NREL, p. 8, March 2009.
[15] Edmund G. Brown, et al., *California Attorney General Response to ALJ's Request for Briefs Regarding Jurisdiction to Set Prices for a Feed-In Tariff*, Docket No. R0808009. August 21, 2008

Finding: Plentiful Resources, but Little Development

The Southeast possesses a variety of renewable energy resources, including biomass, solar and wind (Appendix A). Yet these resources have not been developed to comprise any meaningful portion of the region's energy mix. Biomass is the region's most important near-term option. Today, biomass and hydroelectric power are equally responsible for nearly all of the Southeast's renewable energy generation.[16] Most Southeast states also possess good solar resources; second only to the U.S. Southwest.[17]

Near Term Renewable Energy Resource Potential in the Southeast [18]

Total Potential Capacity (MW)	**SE11**	**SE8**	**AL**	**AR**	**FL**	**GA**	**KY**	**LA**	**MS**	**NC**	**SC**	**TN**	**VA**
Onshore Wind	70,911	60,950	-	9,655	186	4,728	306	-	-	15,777	924	4,395	34,940
Offshore Wind	494,047	494,047	-	-	40,300	71,472	-	-	-	140,097	149,768	-	92,410
Biomass	92,906	70,825	10,861	8,634	6,727	12,175	5,674	7,773	13,137	9,111	6,502	6,651	5,660
Hydroelectric	63,274	36,785	4,877	12,714	1,075	4,066	6,497	7,279	6,709	4,231	2,242	8,797	4,789
Geothermal	1,058,703	589,848	102,865	214,522	39,114	39,018	60,051	194,281	200,743	49,716	69,226	50,733	38,433
Solar	545,476	423,787	48,567	42,136	90,516	65,187	38,282	41,271	39,768	55,628	32,022	45,851	46,249
Total	**2,325,317**	**1,676,243**	**167,170**	**287,660**	**177,918**	**196,645**	**110,810**	**250,604**	**260,357**	**274,561**	**260,684**	**116,427**	**222,481**
Maximum Feasible Capacity (MW)	**SE11**	**SE8**	**AL**	**AR**	**FL**	**GA**	**KY**	**LA**	**MS**	**NC**	**SC**	**TN**	**VA**
Onshore Wind	14,106	10,819	-	3,186	49	1,560	101	-	-	4,857	305	2,089	1,959
Offshore Wind	179,390	179,390	-	-	612	17,180	-	-	-	73,789	43,360	-	44,450
Biomass	27,515	20,346	3,028	2,559	2,380	3,049	2,120	2,490	4,512	2,332	1,561	2,091	1,393
Hydroelectric	9,031	5,926	1,053	1,402	181	525	976	727	708	766	453	1,296	944
Geothermal	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar	79,298	58,951	8,256	7,747	9,826	8,790	5,843	6,758	7,397	7,691	4,664	6,438	5,888
Total	**309,341**	**275,432**	**12,337**	**14,894**	**13,047**	**31,104**	**9,040**	**9,975**	**12,618**	**89,435**	**50,344**	**11,914**	**54,634**
Maximum Feasible Generation (GWh)	**SE11**	**SE8**	**AL**	**AR**	**FL**	**GA**	**KY**	**LA**	**MS**	**NC**	**SC**	**TN**	**VA**
Onshore Wind	33,166	25,682	-	7,256	86	3,635	228	-	-	11,882	679	4,645	4,753
Offshore Wind	644,902	644,902	-	-	2,069	52,788	-	-	-	262,557	169,252	-	158,236
Biomass	204,878	151,496	22,548	19,053	17,721	22,703	15,785	18,544	33,597	17,364	11,624	15,569	10,371
Hydroelectric	36,046	23,660	4,038	5,168	683	2,015	4,538	2,681	2,610	3,057	1,856	5,738	3,662
Geothermal	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar	166,799	124,071	17,821	16,550	21,532	18,668	11,546	14,632	15,609	15,798	9,895	12,824	11,924
Total	**1,085,792**	**969,810**	**44,407**	**48,027**	**42,091**	**99,809**	**32,098**	**35,856**	**51,817**	**310,659**	**193,306**	**38,777**	**188,945**
Total excluding offshore wind	***440,889***	***324,908***	***44,407***	***48,027***	***40,022***	***47,021***	***32,098***	***35,856***	***51,817***	***48,101***	***24,054***	***38,777***	***30,709***
Current Renewable Generation (2005-2007 avg)	51,333	40,748	10,468	4,041	5,169	5,824	2,853	3,692	1,415	5,599	2,585	7,242	2,446
Total Generation (2005-2007 avg)	1,182,861	943,179	137,694	51,113	220,931	139,597	97,094	91,475	47,098	126,974	101,129	93,669	76,087

The renewable resources and renewable policies in Florida, Tennessee, and North Carolina are highlighted in this report as a representation of the greater region.

- Florida is the largest state and renewable energy market in the region and has been debating implementation of a renewable energy policy for several years.

[16] Southern Alliance for Clean Energy, *Yes We Can: Southern Solution for a National Renewable Energy Standard*, p. 2, February 12, 2009.
[17] National Renewable Energy Laboratory, at: http://www.nrel.gov/gis/solar.html.
[18] Southern Alliance for Clean Energy, *Yes We Can: Southern Solution for a National Renewable Energy Standard*, p. 7, February 12, 2009.

- Tennessee is home to the TVA which is the largest government-owned utility in the country – its territory includes almost all of Tennessee and parts of six other regional states.
- North Carolina is the only state in the region with a comprehensive renewable energy policy.

Non-hydroelectric renewable resource development in the three highlighted states – Florida, Tennessee, and North Carolina – represents less than 2 percent of total generation capacity, yet all three states have programs in place intended to promote renewable energy development (Appendix B). The programs include:

Production-based incentives

- Qualifying Facility (QF) program,
- Net metering,
- RECs through the North Carolina Renewable and Efficiency Portfolio Standard (REPS),
- The nation's first generation cost-based FIT program, by the Gainesville Regional Utilities (GRU) for solar PV projects up to 250 kW,
- Two non-generation cost-based FIT programs: the TVA GP program for renewable projects up to 200 kW, and the TVA RSO program for renewable projects up to 20 MW, and
- Other production-based incentive programs:
    - NC GreenPower
    - Duke Energy Carolinas (Duke) standard offer
    - Progress Energy Carolinas (PEC) standard offer
    - OUC Solar Pilot Program

Non-production-based incentives

- Tax incentives
- Rebates
- Grants

Finding: Existing Policies, With the Exception of the North Carolina REPS, the GRU and TVA GP FIT, Fall Short in Meaningful Renewable Energy Development

The Southeast region offers a host of production-based incentives to renewable energy producers. Renewable energy developers can also avail themselves of state and federal tax credits as well as state rebates and grants. Non-production-based incentives, such as tax credits, rebates and grants have not by themselves encouraged meaningful renewable energy development. Renewable energy producers generally require the expectation of an appropriate long-term revenue stream for project viability. In this respect, the North Carolina REPS[19], the GRU FIT and the TVA GP FIT have been most successful in driving relatively significant renewable energy development.

Production-based incentives

Production-based incentives, also known as performance-based incentives, provide cash payments based on the number of kilowatt-hours (kWh) or BTUs generated by a renewable energy system, They can be classified as the PURPA-QF program, net metering programs, RECs provided through an RPS program, FIT programs, and other production-based incentive programs.

PURPA-QF programs: The Public Utility Regulatory Policies Act (PURPA) was enacted in 1978 with a goal of encouraging increased energy independence in the U.S. It requires retail utilities to buy power from qualifying facilities (QF) at the utility's avoided cost. Under PURPA, two types of facilities are eligible for QF status: small power production and cogeneration facilities.[20] To become a QF, a small power production facility must meet the size and fuel requirements set out in FERC's regulations.[21] A QF can also self-certify by filing with FERC a notice of self-certification, if it meets the size and fuel requirements.

While FERC determines QF status, a state legislature, or more likely as state utility commission, determines a utility's avoided cost. Avoided costs is defined in PURPA as "the cost to the electric utility of the electric energy which, but for the purchase from such cogenerator or small power producer, such utility would generate or purchase from another source."[22] A state commission therefore, cannot mandate that power be purchased by state utilities from renewable energy developers above the utility's avoided cost.

In practice, the value estimated for avoided cost is set at too low a price point to encourage significant renewable energy development in the Southeast, especially solar

[19] The REPS is an RPS policy in North Carolina that allows the regulated utilities to meet a portion of the goal with energy efficiency savings.
[20] 16 U.S.C. § 824a-3(a).
[21] 18 C.F.R. 292.203(a).
[22] 16 U.S.C. §824a-3(d).

development.[23] Although some bioenergy projects have been completed under the PURPA-QF program in the Southeast, developers often comment that these are typically developed with primary purposes other than electricity sales.

Since the Southeast states, with the exception of North Carolina's RPS, called the Renewable Efficiency Portfolio Standard (REPS), haven't implemented comprehensive statewide renewable energy policies, the value of renewable energy is measured by applying this "avoided cost" standard.[24]

The avoided cost standard is of particular importance in the Southeast, where vertically integrated utilities and TVA control the vast majority of the market. TVA and the IOUs purchase power under various adaptations of the avoided cost standard, and methods used across several Southeastern states to determine avoided cost vary significantly in structure and method.[25]

The prices paid to QFs in the region depend on several factors including the time of day the power is delivered and whether the power provided by the QF can explicitly avoid or defer the construction of additional power generation. If so, the QF is also entitled to a capacity payment in addition to the payment for energy. The avoided cost benchmarks vary among Southeast region states but range from 4 cents to 6 cents / kilowatt (kWh).[26] The table below is offered as a simple snapshot of various payments for energy only.

[23] The levelized (life cycle) cost of solar PV is significantly higher than the rate for full avoided cost.
[24] The North Carolina REPS statute caps costs at an amount above "avoided costs."
[25] A comprehensive comparative review of avoided costs in the Southeast is beyond the scope of this report. It is an area of policy work that would benefit from further research because of the importance avoided cost plays in the development of renewable energy.
[26] A recent PPA between Hillsborough County and Seminole Electric Cooperative paid a rate of $0.056 per kWh for third party power generated at the Hillsborough County Resource Recovery Facility. See Hillsborough County, Florida, Memorandum on Electric Power Purchase and Sale Agreement with Seminole Electric Cooperative, Inc., January 26, 2010.

Range of Energy Rate Payments in Southeast

Utility	System Size	Price offered for energy
FPL – FL	<100 kW	5.45 cents / kWh [27]
Duke – NC	< 5 MW	4.67 cents / kWh [28]
TVA	No limit indicated	3.51 cents / kWh [29]

The infeasibility of PURPA-QF program structure for developers is also due to contract provisions that make it unlikely a developer would receive full payment of the already-low avoided cost rate. Biomass developers in Florida, for instance, cite untenable contract provisions such as: performance requirements that require 97% capacity level for a maximum capacity payment; the utility's ability to dictate the generator's maintenance schedule; and excessive time frames for the utility to exercise first right of refusal over the purchase of RECs.[30] A developer who does not agree to these terms instead receives an "as-available" energy rate that effectively values capacity at zero.[31]

Net metering: Net metering programs allow customers to offset their use of electricity at the retail rate with renewable energy resources. Excess generation is credited back to the owner at the utilities' avoided cost or at the retail rate. Net metering can also be thought of as a very simple production-based incentive program. The region's net metering programs have not encouraged significant deployment of renewable energy because the program incentive is too low or not available in some service territories. For instance, in Florida Power and Light's (FPL) territory of 4.5 million customers, there have been a mere 650 systems that have been interconnected.[32] Since the program is readily available to all FPL customers, the relatively poor participation is presumably caused by the low level of incentive.

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[27] Florida Power and Light, *Tariff: Revised Sheet No. 10.100 FPL, COG-1: As Available Rate*, Effective May 13, 2010 for October 1, 2010 – March 31, 2011. The Company will purchase, at its option, energy offered by any Qualifying Facility located within the State of Florida. As-Available Energy is described by Florida Public Service Commission (FPSC) Rule 25-17.0825, F.A.C. and is energy produced and sold by a Qualifying Facility on an hour-by-hour basis for which contractual commitments as to the time, quantity, or reliability of delivery are not required. These rates are used as the basis for contract negotiations for larger-sized projects.

[28] Duke Energy Carolinas, LLC, *Schedule PP-N, North Carolina Ninth Revised Leaf, No. 91*. Available only to establishments located in the Company's North Carolina service territory which have non-hydroelectric qualifying facilities fueled by trash or methane derived from landfills, hog waste, poultry waste, solar, wind, and non-animal forms of biomass contracting to sell generating capacity and energy not in excess of five MW and interconnected directly into the company's system.

[29] TVA, *Dispersed Power Production Guidelines*, July 1, 2010, at: http://www.tva.gov/abouttva/pdf/dispersed.pdf.

[30] Wheelabrator Technology Inc. *Protest of Order No. Florida PSC-080544*, September 9, 2008.

[31] FPL offers an available rate of 5.45 /kWh. If the third party provider agrees to performance and delivery requirements, they will be paid an additional $7.44 / *kW* annually as a capacity payment under a normal payment scenario starting on June 1st 2010. *See* FPL Tariff: Revised Sheet No. 10.202, COG-2, Firm Capacity and Energy, Effective April 12, 2004.

[32] Florida Power and Light, *2010 Power Plant Ten Year Site Plan*, April 2010.

While it is offered in North Carolina, net metering participation in the state is "very low," because there are production-based incentive programs that offer higher levels of compensation to renewable energy providers.[33] Customers who would utilize net metering programs are instead able to garner greater compensation through the NC GreenPower program or the Duke and PEC standard offer programs for RECs that help those utilities meet their REPS compliance.

North Carolina REPS: North Carolina stands out in the Southeast as the only state with a RPS. The North Carolina policy is one of 29 mandatory state RPS programs in the U.S. that set targets and timelines for renewable energy generation or procurement by state utilities (Appendix D).

The North Carolina Renewable and Efficiency Portfolio Standard (REPS), which passed the General Assembly in 2007, set a target of 12.5 percent renewable energy by 2020, with interim targets that include a 3 percent mandate in 2012. The REPS requires a set-aside for solar power of 0.20 percent of a respective utilities kWh generation by 2018, with an interim target date of 2010. Energy efficiency can be used to meet 25 percent of the overall target. The REPS compliance costs are capped by the state's utility commission according to customer class per year.[34]

The REPS policy is significant because it will likely vault North Carolina into a leader on renewable energy development in the Southeast in 2012. A third-party administrator is tracking the RECs in North Carolina, and it is not clear, at this point, if the utilities are on pace to meet their REPS obligations.[35] That said, Duke is already ahead of schedule in meeting its solar set-aside requirement. The company is completing a 10 MW program of utility owned solar PV distributed generation and has secured another 16 MW of central station solar PV. That will meet Duke's solar set-aside REPS requirement through 2014.[36]

One criticism of the RPS model is that it requires significant time and resources to bid or negotiate contracts for sale of power and RECs – especially for developers of smaller projects. In such circumstances, this can drive up the required return on investment for competitive bidding or negotiations.[37] The overall market structure that results from a negotiated or competitive bidding framework tends to make it more difficult for small projects to participate and can limit the investor pool.

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[33] Conversation with North Carolina Utilities Commission staff member, Kenny Ellis, June 2010.
[34] N.C. Gen. Stat. §62-133.7(h)(4),
[35] North Carolina Renewable Energy Tracking System (NC-RETS), at: http://www.ncrets.org/resources/index.htm#public-reports.
Rebuttal Testimony of Owen A. Smith, Director, Corporate Strategic Initiatives and Regulated Renewables Strategy for Duke Energy, Docket E-7, Sub 856, p. 5.
[37] *See* Cory, et al., *Feed in Tariff Policy: Design, Implementation, and RPS Policy Interactions*, p. 9, March 2009.

Feed-in Tariffs

The region has three FIT programs intended to spur additional renewable energy development in the region: TVA's Generation Partners (GP) program, TVA's Renewable Standard Offer (RSO), and Gainesville Regional Utility's (GRU) FIT program. Only the GRU program is designed as a generation cost-based program intended to pay for the cost of generation plus a stipulated rate of return on investment. The others pay a lower kWh incentive for the generation of electricity from renewable resources. All three programs offer long term standard offer contracts of varying duration and rates. The three programs provide a valuable template for expanding FIT programs in the region, but are not yet large enough in scale to be compared favorably with successful renewable energy policies in other parts of the country.

TVA GP program: TVA's GP program utilizes a FIT premium price-based model for eligible technologies. For solar systems, the premium is 12 cents / kWh on top of the retail electricity rate; and for wind, low-impact hydro, and biomass, 3 cents / kWh. The payment is made regardless of whether the power is consumed onsite or delivered to the distribution system. Thus, assuming a 10 cent / kWh retail rate, the total payment to the customer is 22 cents per kWh for solar PV and 13 cents per kWh for other renewable resources. The program is implemented through 115 of TVA's 155 distribution utilities in 7 states.[38]

The TVA GP program was started in 2003 and restructured in 2009 with a new pricing structure and extension beyond the original 50 kilowatt (kW) size limit up to 999 kW sized systems. On April 1, 2010, the rules changed to allow for consideration of applications for projects not yet constructed; after which, TVA received 75 applications in 8 weeks – an unexpected surge in demand. TVA recognized that it could surpass its budgeted amount for the pilot program and ceased taking applications on June 16, 2010. It resumed the program one week later when TVA announced it would accept all solar, wind and biomass installations, but only up to 200 kW. The TVA Board will likely consider redesigning the program to provide a greater sense of certainty to customers prior to reaching the program's cap.[39]

Generation Partners Approved Projects[40]

Technology	No. of projects	Capacity
Solar	461	43 MW
Biomass	18	16 MW
Wind	16	70 kW
Micro Hydro	1	110 kW

[38] TVA, *TVA Participating Power Distributors*, at: http://www.tva.com/greenpowerswitch/partners/distributors.htm
[39] *Id*.
[40] *Id.*

Following the restriction of its Generation Partners program to 200kW or less, TVA offered a new, distinct standard offer contract for renewable energy systems from 201 kW to 20 MW called the Renewable Standard Offer (RSO) program.

TVA RSO program: To accommodate larger systems, TVA announced in early October 2010 that it was initiating a new standard offer contract program for systems from 201 kW to 20 MW. TVA's RSO initially will be limited to a total of 100 megawatts from all participants, with no single renewable technology representing more than 50 megawatts of the total.[41] The program will offer different rates based on the time of day, with an average payment of about 5.61 cents / kWh.[42] To date, TVA's standard offer program has received little interest, primarily due to a low price per kWh and restrictive contract terms that add costs to a project.

GRU generation cost-based FIT program: Modeled on Germany's FIT program design, the GRU FIT purchases energy from qualified solar PV systems via standard offer contracts for a period of 20 years at a payment of up to 32 cents / kWh in 2010. The payments are guaranteed, fixed payments with tariffs differentiated by size and by roof mounted or ground mounted systems. The payments are intended to compensate the renewable energy project owner for the cost to generate electricity plus a return on investment of 5 percent.[43]

GRU aims to deploy 32 MW of solar PV by 2017. The program is open to both residential and commercial customers but is capped to systems no greater than 250 kW. Its annual program cap is 4 MW – the program was fully subscribed after 3 weeks. The program is limited to 4 MW per year in order to not exceed an annual rate impact of 0.6 percent annually.[44]

GRU has announced revisions to the program for 2011.The first is to make the program more accessible to residential projects. Currently, about 90% of approved contracts are from commercial operations.[45] Therefore, a set-aside of 200 kW has been created in 2011 for residential systems of up to 10 kW.[46] Additionally, tariffs will be reduced for larger roof mounted and ground mounted systems, from 32 cents to 29 cents / kWh and from 26 cents to 24 cents / kWh respectively.[47] The tariff reduction is due to falling solar PV capital costs. The second round of application acceptance for the 2011 tariffs began in January and was quickly subscribed. An independent 3rd party selected 55 projects from random drawing.[48] The program has been successful in meeting its first year target for

[41] TVA News Release, *TVA Launches New Renewable Power Initiative, Continues Generation Partners Growth*, October 8, 2010.
[42] TVA, *Renewable Standard Offer*, at*:* http://www.tva.com/renewablestandardoffe*r* (last visited February 20, 2011).
[43] GRU, Solar Feed-in Tariff Workshop, June 9, 2010, at: http://www.gru.com/Pdf/SolarFIT/SolarFITContractorWorkshop6-9-10.pdf.
[44] Conversation with Ed Regan, GRU's Assistant General Manager for Strategic Planning, July 2010.
[45] Gainesville Sun, *Gainesville Plans to Make Solar Feed-in More Available*, July 2, 2010.
[46] GRU, *GRU Reopens Solar FIT Oct. 4*, September 27, 2010.
[47] *Id.*; *see also* GRU, Solar Feed-in Tariff Workshop, June 9, 2010.
[48] GRU, *Solar FIT*, at: https://www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp

applications of 4 MW. About 3.5 MW of solar PV have thus far been deployed[49] (Appendix F).

One criticism of the generation cost-based FIT programs is that they tend to develop smaller sized projects without recognizing the economic benefits of economies of scale of larger projects that can drive down kWh program costs. While the GRU FIT addresses the needs of small renewable energy projects, it does not necessarily maximize market competition that drives down prices.[50]

Other production-based incentive programs:

NC GreenPower: NC GreenPower is an independent, nonprofit organization established to provide production based incentives funded by voluntary contributions to the program. The program accepts financial contributions from North Carolina citizens and businesses to help offset the cost to produce green energy. The program offers short term, *non-guaranteed* standard offer contracts to willing participants contingent on adequate funding.[51]

Participants have the option of setting up a power purchase agreement with a local utility. NC GreenPower agreements are for 5 years, with the option to renew on an annual basis after the initial contract. Under a "Sell All" arrangement," the program pays 15 cents / kWh for programs under 10 kW. For wind systems under 10 kW, NC GreenPower pays 9 cents / per kWh. The non-guaranteed nature of the payments invariably provides little financial certainty to developers of significantly sized renewable energy projects. The program has 372 participants – mostly small solar PV projects of approximately 4kW each.[52]

Duke Standard Offer: In order to help comply with the REPS requirements Duke purchases RECs from qualifying renewable energy facilities through a standard offer program. This program is open to projects that are able to provide up to 250 solar RECs per year. This was a limited offer that expired in June 2010. At that time, the standard offer solar REC price was 3.1 cents / kWh and 0.6 cents / kWh for general RECs in 2010.[53] The program had approximately 20 participants and none of them were solar energy producers when it originally expired in June 2010.[54] The program was re-introduced in early October 2010 with a solar REC price of 3.0 cents / kWh.

[49] GRU, *GRU Reopens Solar FIT Oct. 4*, September 27, 2010
[50] Recurrent Energy, *Reply comments of Recurrent Energy on ALJ's Ruling Regarding Pricing Approaches & Structures for a Feed-in Tariff*, Rulemaking 08-08-009, August 21, 2008.
[51] NC GreenPower, at: http://www.ncgreenpower.org/about/program_overview_2.html.
[52] NC GreenPower, at: http://www.ncgreenpower.org/resources/generators.php.
[53] Duke Energy Carolinas, *Standard Purchase for Renewable Energy Certificates*, at, http://www.duke-energy.com/pdfs/REC-Purchase-Offer-Info.pdf (last visited on February 2, 2011).
[54] Conversation with Steve W. Smith, Duke Energy Carolinas, on September 2010 and February 2011.

The program has an internal cap that Duke will not reveal.[55] The lack of transparency and certainty in this program likely does not inspire investor confidence and may explain the lack of participation in the program. Without a transparent program cap, applications to standard offers could be rejected for exceeding an unknown internal program cap. Therefore, this program does not qualify as a FIT for purposes of this report because of the uncertain nature of its standard offer.

PEC SunSense Standard Offer program: PEC began offering incentives to *non-residential* customers in North Carolina and South Carolina for generating electricity from solar PV systems in July 2009. PEC pays 18 cents / kWh for the electricity and RECs generated by the PV system for a period of 20 years to help it comply with its REPS requirement.

The program offers long term contracts – for a 20 year term. The payment is fixed and guaranteed and was limited to project sizes up to 250 kW in 2010. Unfortunately, it has met with limited success. Anecdotal evidence suggests that developers are not interested in developing projects of that size, preferring instead larger projects. That is because their financing partners are looking for larger projects that can provide a greater total return on investment.

The program is still in its infancy, and the program had only reached 2.5 MW of its 2010 5 MW goal by September 2010.[56] PEC has increased the eligible project size for 2011 to 500 kW, but the company reserves the right to decline applications on criteria that the company does not define or disclose. From the investor's standpoint, the arbitrary nature of declining applications lacks certainty and transparency and may explain why PEC was falling short of its 5 MW goal in 2010. Additionally, PEC's ability to arbitrarily reject applications in response to the standard offer disqualifies it a FIT program for purposes of this report.

Orlando Utilities Commission Pilot Solar Program: The Orlando Utilities Commission (OUC), through its Pilot Solar Program, offers an incentive payment for the purchase the RECs from customers who install a solar PV and/or solar thermal energy system on their property. The FIT payment is 5 cents / kWh for solar PV. The solar PV project receives the tariff for PV-generated electricity consumed onsite, with any excess credited to the customer at the full retail rate. The payment term is 5 years and renews for successive 5 year terms unless terminated by either party. As part of its Solar Pilot Program, OUC also provides an incentive payment for solar water heating systems of 3 cents / kWh. The solar thermal system payment converts British Thermal Units (BTU) created by the system to a kWh equivalent.

[55] *Id.*
[56] PEC, *SunSense Commercial Solar Program Update*, September 2010.

OUC Pilot Solar Program Participation Levels

Number of FIT solar thermal customers	235
Number of FIT PV customers	62
Capacity of thermal solar	615.80 kW
Capacity of PV solar	1.440 MW
Number of customers in application process	64

The OUC program has encouraged almost 1.5 MW since its inception several years ago. The contract length of five years and the relatively low incentive of 5 cents /kWh may be hindering the program from achieving greater participation. Additionally, OUC's payment for *only* power that is consumed onsite disqualifies it as a FIT for purposes of this report.

Non-production-based incentives: tax credits, rebates and grants

Tax incentives: Tax credits are probably the most common option in the U.S. to promote the commercialization and deployment of renewable energy technologies. The most available form of tax credit across the region is the federal investment tax credit (ITC). The ITC is available for personal and business entities (including utilities) choosing to install solar PV systems. The credit also extends to fuel cells, small wind turbines, geothermal systems, micro turbines and CHP. For solar power, the credit is equal to 30% of expenditures, with no maximum credit.[57]

North Carolina also offers a state tax incentive, the most generous state tax incentive of the three states at 35 percent. A 35 percent state tax credit coupled with the 30 percent federal ITC can drive down the project cost of new systems by 65 percent.

Tax incentives can significantly lower project costs. Even with significantly lower project costs, however, solar projects have not been able to be developed in the Southeast without requiring a payment in excess of avoided cost. The examples below illustrate this point, as the tax incentives alone were not able to make the projects price-competitive with conventional generation.

- Duke's 10 MW distributed solar PV project has taken advantage of the state tax incentive and the federal ITC to substantially lower the project cost of its program.[58] Yet, the company would have never proceeded with the project if not for the REPS program that allows for cost recovery above the company's avoided

[57] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F.
[58] Testimony of Owen A. Smith, Director, Corporate strategic Initiatives and Regulated Renewables Strategy for Duke Energy, Docket E-7, Sub 856, p. 15, July 25, 2008.

cost.[59] A REPS rider allowed the company to pass on the incremental cost (above avoided cost) to the rate base.

- FPL has taken advantage of the federal ITC to bring down the cost of its 25 MW solar PV plant in De Soto, Florida.[60] Yet, the company would have never proceeded with the project if the legislature had not amended state statute in 2008 to provide for guaranteed cost recovery for 110 MW of renewable energy projects.[61] The cost recovery change was critical because the projects levelized cost was considerably higher than the utility's avoided cost.[62]

Rebates: Rebates for solar PV are primarily used to encourage the installation of new capacity and are delivered to the system's owner after installation to offset up-front costs already incurred. These programs vary widely nationally, depending upon the size and type of installation and the program administrator.

California has the most aggressive statewide incentive rebate program in terms of the number of different types of incentives, the $2.2 billion total funding available, and statewide capacity goals. The California Solar Initiative (CSI) aims to install 1,940 MW of new PV within the state by the end of 2016.[63]

The National Renewable Energy Laboratory (NREL), in a report evaluating 5 state rebate programs concluded that the small market share that rebate programs have established for distributed renewable energy technologies suggests that rebate programs *alone* are not likely to single-handedly drive the emergence of a new clean energy economic sector.[64]

There are no state-wide renewable energy rebates in the 3 highlighted states. Even if the states were to adopt meaningful rebate programs, however, those programs alone are not likely to create a vibrant state market for renewable energy development.

Grants: Similar to rebates, cash grants are intended to assist in paying down the up-front costs of installing a renewable energy system. However, a grant is generally distributed to a system owner prior to the installation of the system and can even be used to encourage R&D or support commercialization.[65]

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[59] *See* Testimony of Jane L. McManeus, Director, Rates for Duke Energy Carolinas, Docket E-7, Sub 856, July 25, 2008. (The company testified that it would recover its incremental cost of the project, above avoided cost, through an annual rider as permitted by NCUC rules).
[60] The White House, The *Recovery Act Promoting Clean, Renewable Energy: Investment in Wind and Solar*, at: http://www.whitehouse.gov/recovery/innovations/clean-renewable-energy#20.
[61] §366.92(4), Fla. Stat.
[62] The company has never disclosed the levelized cost of its De Soto project, its only burden to the FPSC was to prove that capital costs were reasonable and prudent. Anecdotal evidence suggests that it was approximately 24 cents / kWh.
[63] California Public Utilities Commission, *California Solar Initiative 2010 Annual Program Assessment*, July 9, 2010 (three years into the state's 10-year solar program, California is already 42 percent of the way towards its general market program goal in the territories of the investor-owned utilities).
[64] Lantz and Doris, State Clean Energy Practices, Renewable Energy Rebates, NREL, p. 16, March 2009.
[65] Burgie and Crandall, *The Application of Feed-in Tariffs and other Incentives to Promote Renewable Energy in Colorado*, p. 23, September 29, 2009.

There is no dedicated source of grant funding in Florida. The Florida Renewable Energy Technologies Grants Program, originally established in 2006, has no funds remaining in the program in 2010.[66] North Carolina and Tennessee have ongoing renewable energy grant programs.

The North Carolina Green Business Fund, created in 2007, provides funding to North Carolina small and mid-size businesses, nonprofit organizations, state agencies and local governments to encourage the development and commercialization of "promising" renewable energy and green building technologies. Of the 18 grants awarded in 2010, 4 grants appear to have gone to either established biomass or solar related technology companies.[67] The others were distributed to presumably fledgling companies to help bring their product or technology to commercialization.

The Tennessee Solar Institute offers a renewable energy grant program formally administered by the State of Tennessee Department of Economic and Community Development, Energy Division. The Institute recently announced $4.5 million in solar installation grants awarded. Sixty five grants made up the first round of award recipients, which is expected to produce 2.8 MW of new solar development in Tennessee. A total of $9 million is allocated to the Solar Installation Grant program. [68] While the first round of grant awards is expected to create almost 3 MW of solar, the program's remaining 50 percent of its funding is expected to be distributed in 2011 and future funding has not been identified.

A review of the literature provides insufficient information to determine the impact that grant policies have on renewable energy development. To maximize the effectiveness of grant program policies, it is essential that the grants are designed to complement and work with other policies to address different market barriers.[69]

[66] The program was not funded in 2009-10 by the State, effectively suspending any new grants for now.
[67] North Carolina Board of Science and Technology, *North Carolina Green Business Fund 2009 Award Winners*, at: http://www.ncscitech.com/PDF/gbf/ncgbf_2009_round_2_awardees.pdf.
[68] Tennessee Solar Institute, *TSI Announces 4.5 Million in Solar installation grants, enabling 2.8 MW of new solar conversion in Tennessee*, at: http://www.tennessee.edu/media/releases/081310_solar.html.
[69] Doris, et al., *State of the States 2009: Renewable Energy Development and the Role of Policy*, NREL, p. 53, October 2009.

Finding: FIT Program Design Options Can Meet Policy Maker's Goals

A successful FIT design can help lawmakers in the Southeast meet their policy goals. Policy goals typically include: rapid renewable energy development, job creation and economic development, greenhouse gas reduction, minimizing rate impacts to customers, energy diversity, promoting a sustainable renewable energy market, financial security for investors and policy transparency. Significant FIT program design options are summarized below.[70]

Eligible technologies: FIT programs can encompass a wide range of eligible technologies. To some extent, the list of eligible renewable sources depends on the objectives of the program. German, Ontario and Spanish lawmakers have made rapid deployment of renewable energy a priority. Therefore, these programs support a wide range of technologies and offer payments for wind, both offshore and onshore, solar PV, geothermal, small hydropower, biomass and biogas.

Tariff differentiation – technology, size, and resource: Varying tariffs by technology, size, resource, and fuel source create another level of granularity in setting tariff prices. Different technologies have different project costs. Providing one payment rate for technologies with different project costs would result in incentives that either over or underpay. Likewise, larger projects can take advantage of economies of scale and may enable a lower payment per unit of output than smaller projects. Additionally, certain renewable sources, like wind, may have inherent geographic advantages and warrant different tariffs to reflect the resource advantage. The premium can also include a premium for the time of day (TOD) the electricity is delivered to the distribution or transmission grid.

Setting the price: Getting the price right in FIT design can be the most challenging aspect. If the tariff price is too high, the tariff can over stimulate the market, substantially increase costs for utility customers, and arouse public opposition to the program. If the tariff price is set too low, the program will not provide an adequate return to investors and will fall short of stimulating project development, likewise eroding public support for the program.

Until recently, there have been two primary methods for setting a FIT price, one based on estimates of generation-based cost, the other based on the value of alternatives available to the utility. In the generation cost-based approach, the FIT payment is based on administratively-estimated costs of "representative" or "typical" renewable energy generation plus a stipulated return on investment. The advantage claimed for this approach is that the FIT payments can be specifically designed to ensure that project investors recoup their investment and obtain a reasonable rate of return.

[70] For a comprehensive discussion on FIT program design *see* Couture, et.al., *A Policy Makers Guide to Feed-in Tariff Policy Design*, NREL, July 2010.

However, it is inherently difficult to accurately or transparently determine a uniform or stable generation-based cost for widely differing projects employing diverse and rapidly evolving technologies such as solar, or to calculate or allocate investor returns across industry value chains. Therefore, some policy makers and utilities have rejected pricing based on models of generation-based cost in favor of "value-based" approaches. These approaches focus on the value of renewable power delivered to the utility relative to the alternatives available to it, given its particular resource and regulatory constraints. Here, value is usually represented by the costs that the purchasing utility can avoid through FIT purchases. Several examples follow:

- California's 2006 statute first authorizing FIT programs for certain facilities up to 1.5 MW used the State's legislatively-mandated 'Market Price Referent' (MPR) to establish the price for small renewable generators.[71] The MPR represents the cost to own and operate a baseload combined cycle natural gas power plant over various time periods. The cost of electricity generated form such a plant, at an assumed capacity factor and set of costs, is the proxy for the long-term market price of electricity.[72]
- California's 2009 statute[73] (known as SB 32) expanded the earlier FIT program to cover facilities up to 3 MW. In establishing the FIT price to be offered by IOUs, the statute –
    - expressly included avoided environmental compliance costs (for GHG emissions reductions, pollution offsets, etc.);
    - authorized the California Public Utilities Commission (CPUC) to include time-of-day values; and
    - directed the CPUC to consider assigning a value for electricity that could offset peak demand on the distribution circuit where the facility is located.
- The Sacramento Municipal Utility District (SMUD) value-based FIT was designed for eligible renewable and CHP projects up to 5 MW. FIT rates reflect SMUD's marginal cost (market price, ancillary services, generation capacity, transmission and sub-transmission capacity), adjusted for time of delivery. For eligible renewables, the rates also reflect avoided GHG mitigation costs and natural gas price risks.[74] Together, the costs and risks that SMUD can avoid through FIT purchases comprise the value of those purchases to the utility and its customers.

[71] California Public Utilities Code §§399.20, 399.15.
[72] California Public Utilities Commission Resolution E-4118, October 4, 2007, at p. 5. The 2006 FIT program, later extended to other facilities up to 1.5 MW, has not played a major role in increasing overall state renewable energy capacity, adding about 6 MW of capacity with 34.6 MW with signed contracts.
[73] Now California Public Utilities Code §399.20 (for IOUs) and §387.6 (for publicly-owned utilities).
[74] See SMUD's *Feed-In Tariff FAQs*, available at http://www.smud.org/en/community-environment/solar-renewables/pages/feed-in-tariff.aspx.

In addition to value- and generation-cost based FITs, a third model has recently emerged from a two-year proceeding before the CPUC.[75] This model, known as the Renewable Auction Mechanism (RAM), adapts earlier FIT programs to larger renewable energy projects (1-20 MW), and modifies key elements of those programs to protect ratepayer interests, streamline procurement processes, and ensure that viable projects result. Stakeholders may disagree about whether RAM is or is not a "FIT" program, but for policy purposes the procurement mechanics may be more important than the label – and the RAM program has significant elements in common with traditional FIT programs.

Similar to traditional FIT programs, the RAM program streamlines the contracting process, employing standard contract terms and conditions and fixed long-term prices, but it also features:

- pricing established through periodic market-based auction procurement, rather than continuously available administratively-set tariffs, to drive down costs;
- selection based on least-cost, rather than first-come-first-served;
- non-negotiable prices based on submitted bids;
- non-negotiable contract terms and conditions; and
- viability screens to ensure that projects offered will actually get built.

In other words, under the RAM program, sellers that meet minimum viability criteria[76] are eligible to submit non-negotiable price bids; IOU buyers select the lowest-priced bids first, and sign non-negotiable long-term standard contracts at the bid prices.[77]

Must-take provisions and interconnection standards: Under a traditional FIT program, the utility or its agent typically enters into a "must-take" agreement. Under this arrangement, whenever the participating resource is available, the utility will accept that energy and pay the FIT rate even if lower-cost resources are available, ensuring that the renewable resources are able to contribute to the power mix. Interconnection rules can also be established legislatively, administratively, or by contractual agreement with the grid operator. Absent jurisdictional concerns, procedural differences or timing conflicts, standard interconnection rules may establish a greater amount of certainty and ease grid access for renewable energy developers.[78]

[75] Beginning in early 2009, as part of CPUC Rulemaking 08-08-009.
[76] Viability requirements include development and performance deposits, project site control, developer experience, commercial technology, filed interconnection applications, and the ability to meet an 18-month timeline for commercial operation. *See* Paul Douglas, *Renewable Auction Mechanism: New Procurement Tool for Renewable Generation*, California Public Utilities Commission, January 19, 2010.
[77] See CPUC D.10-12-048, *Decision Adopting the Renewable Auction Mechanism*, issued December 16, 2010 in R. 08-08-009.
[78] DB Climate Change Advisors, *Paying for Renewable Energy: TLC at the Right Price, Achieving Scale through Efficiency Policy Design,* p. 30, December 2009.

Program and project caps: A FIT program can mitigate rate impacts through a MW program cap or a funding cap. A FIT program can also limit the size of eligible projects through project size caps. Program, funding and project cap design depends on the policy objectives of decision makers. If rate impact mitigation is a priority, then a program or funding cap is a tool that will limit renewable energy development and thereby insulate ratepayers from the associated costs. On the other hand, if rapidly expanding renewable energy quantity is a priority, as in Germany or Ontario, a cap limiting development is perceived by some as inconsistent with this policy objective.

Finding: State-wide FIT Programs Must Be Carefully Crafted to Avoid Federal Preemption

State-wide FIT program implementation is constrained because of federal preemption through the Federal Power Act (FPA) and PURPA. The FPA makes it unlawful to make a sale of electricity at wholesale without proving to FERC that the price is just and reasonable. PURPA limits the purchase of power by a retail utility to a QF at the utility's avoided cost. These constraints were reaffirmed in July 2010 by FERC, stating that the California Public Service Commission may not set rates for the sale or resale of energy and capacity by a QF that exceeds the purchasing utility's avoided cost.[79]

Based on this ruling, it appeared at the time that a state could not direct a utility to offer to purchase electricity from a renewable energy seller at a specified price above the utility's avoided cost (the essence of generation cost-based FIT programs) without violating the mandates of PURPA. The most recent FERC order on the avoided cost issue indicates that state utility commissions can utilize multi-tiered avoided cost structure depending on the type of generation resource that is being "avoided" by the purchase of power from different renewable energy technologies.[80] Therefore, state utility commissions could have the leeway to set more attractive avoided cost rates for the procurement of renewable energy from renewable energy owners. This is a quickly evolving area of regulation that warrants monitoring and holds the potential for IOU FIT program advocacy in the Southeast region. This report will utilize well-established law that provides that a state cannot go outside the PURPA obligations without implicating the FPA and FERC – which regulate the sale of wholesale power in interstate commerce and have their own restrictive mandates.

Nevertheless, Southeast states may rely on the utility's PURPA purchase obligation as part of an appropriately designed state-wide FIT program. While the compensation to renewable energy developers cannot be part of the payment for purchasing power under PURPA, there are three additional payment streams under state control that don't implicate federal statutes, including: 1) RECs; 2) payments from other sources, such as a PBF, which (although paid by ratepayers) are not part of the mandatory PURPA rate paid by the utility; and 3) tax credits, loans, or other subsidies granted to the utility and/or the renewable energy seller[81] (Appendix E).

FERC's exclusive authority over wholesale power sales does not mean that U.S. law bars state-level feed-in tariffs outside of PURPA. States can establish a cost-based price or a

[79] FERC Declaratory Order 132 FERC ¶ 61,047 of July 15, 2010. This order was further clarified in October 2010 by FERC Clarifying Order, 133 FERC ¶ 61,059.

[80] FERC Order 134 FERC ¶ 61,044, January 20, 2011 ("[b]ecause avoided cost rates are defined in terms of costs that an electric utility avoids by purchasing capacity from a QF, and because a state may determine what particular capacity is being avoided, the state may rely on the cost of such avoided capacity to determine the avoided cost rate. Thus, the avoided cost rate may take into account the cost of electric energy from the generators being avoided, e.g., generators with certain characteristics.").

[81] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 14, January 2010.

negotiated price based on competitive bidding or through an auction mechanism. The seller can approach FERC on contract-by-contract approval basis for negotiated prices. Alternatively, a seller can pursue blanket approval for a market-based program. FERC will grant a seller advanced approval to sell at any price it can negotiate if the seller proves that it lacks market power and that the competitive nature of the program will keep rates just and reasonable.[82] That said, the time and expense required to secure these FERC approvals may be significant for small and even mid-sized projects.

California's RAM program also appears to avoid FERC preemption because its auction approach will provide market non-negotiable prices that are just and reasonable and not unduly discriminatory.[83] It is important to note that the California RAM price points cannot exceed the state's MPR if the state's IOUs exhaust the California RPS cost-containment funding mechanism. [84] The mechanism will fund auction prices above the state's MPR thereby avoiding PURPA preemption.

It is important to note the FPA does not apply to publicly owned utilities. Therefore, a municipal power system or government-owned entity, such as TVA, can offer programs directly to renewable energy developers with payments above its avoided cost, as long as it is not offered in the context of meeting its PURPA obligation.[85]

[82] *Id.* at 30.
[83] Proposed Decision of ALJ Mattson, *Decision Adopting the Renewable Auction Mechanism*, Rulemaking 08-08-009, August 24, 2010.
[84] Paul Douglas, *Renewable Auction Mechanism: New Procurement Tool for Renewable Generation*, California Public Utilities Commission, January 19, 2010.
[85] Federal Power Act §201(f); *see also* Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 2, January 2010. TVA offers it GP program through participating distribution utilities.

Finding: There are Options Available in the Southeast for Rapidly Deploying Renewable Energy

Based on legal constraints, the following table represents the range of options available to the Southeastern states upon which to construct a FIT program. A discussion regarding the viability of each option follows.

U.S. FIT Models Applicable to Highlighted Southeast States

Option #	Florida	North Carolina	TVA / Tennessee
1) PURPA avoided cost-based FIT	X	X	X
2) FIT payment funded via tax credits	X	X	
3) FIT payment funded via PBF	X	X	
4) FIT payment funded via REC		X	
5) FIT based on RAM procurement	X	X	X
6) TVA GP program			X
7) Municipal generation cost-based FIT programs	X	X	

Option 1: PURPA avoided cost-based FIT

In the Southeast region, A FIT program based on an avoided cost value is the option that provides the least incentive. The avoided cost price point in the Southeast has not supported significant deployment of renewable resources. While utility programs in California have had success in contracting for significant renewable energy projects at the MPR, the MPR payment in effect in 2009 was 11.13 cents / kWh on 20 year contracts,[86] whereas the avoided cost on a recently contracted large-sized biomass project in Florida was negotiated at 5.6 cents / kWh.[87]

PURPA-QF solicitations in the highlighted states have developed less than 2 percent renewable energy capacity as part of the total energy mix. No solar projects have been contracted at a Southeast utility's avoided cost. Hence, without some added value beyond current mandatory PURPA avoided energy and capacity payments, this option is easily dismissed from consideration.

[86] California Public Utilities Commission, *Resolution No. E-4214*, December 18, 2008.
[87] A recent PPA between Hillsborough County and Seminole Electric Cooperative paid a rate of $0.056 per kWh for third party power generated at the Hillsborough County Resource Recovery Facility.

Option 2: FIT Funded via Tax Credit

States in the Southeast can avoid PURPA preemption by utilizing state tax credits to compensate the utility for the difference between its avoided cost and a FIT payment that is higher than its avoided cost. It is important to note that problems can arise when the utility's tax liability is actually lower than the increment of the state-set price above the utility's avoided cost. "In that case, there would be a PURPA violation, because the tax credit would not fully reimburse the utility for its payments above avoided cost. If the credit necessary to make the net utility payment equal to avoided cost exceeds the utility's tax liability, one solution is to make the tax credit refundable; meaning, the state writes a check to the utility for the excess amount."[88]

This option to avoid PURPA preemption is not recommended because of the need for extensive state law changes and an administratively intensive state process to set rates and monitor individual utility tax liabilities. There are no public utility commissions in the Southeast region that have experience with this type of renewable development scheme. Furthermore, reducing taxes on IOUs may not be politically practicable with tight state budgets stemming from the economic recession. Therefore, this option is dismissed from consideration.

Option 3: FIT Funded via Public Benefits Fund

Most PBFs were developed by states during the electric utility restructuring era, in the late 1990s, to ensure continued support for renewable energy, energy efficiency and low-income energy programs. These funds are commonly supported through a small surcharge on electricity consumption. PBFs commonly support rebate programs, loan programs, research and development, and energy education programs.[89] There are 23 states that use a PBF to promote renewable energy, although the Southeast states are not among them.[90] TVA, as a wholesale power provider, cannot institute a PBF.

A PBF-funded FIT, whether it utilizes a RAM procurement system or administratively-set prices, will require state law changes in Florida and North Carolina and will require considerable administrative implementation and oversight. Unlike the tax credit plan , the PBF is a common policy in the U.S. today, although PBF revenues are not typically used to support FIT programs. A benefit of the PBF funded option is that is provides a simpler design than a tax credit plan. As such, lawmakers in the Southeast without much experience in renewable policy should better understand the policy design.

Yet, economically conservative lawmakers may be reluctant to create an additional charge on customer's electricity bills during an economic recession. In fact, a PBF-

[88] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 16, January 2010.
[89] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/summarytables/rrpre.cfm.
[90] *Id.*

funded FIT bill in Florida last legislative session did not receive serious legislative consideration (Appendix C). Therefore, a PBF-funded FIT is not a top recommendation, but is worthy of consideration as an option as opportunities arise in the Southeast.[91]

***Option 4*: FIT funded via REC value**

In addition to the options above, North Carolina can utilize RECs to encourage development of small scale renewable projects. Florida has no in-state market for RECs because it has no RPS and therefore cannot utilize this tool. The North Carolina programs appear to be hindered by designs that lack certainty or transparency. For instance, PEC provides a standard offer contract for commercial customers for solar PV systems up to 500 kW with a payment of 18 cents / kWh. Yet, the company reserves the right to decline applications on criteria which the company does not define or disclose.

Likewise the Duke standard offer program for solar and general RECs, besides offering a relatively low payment of 3.1 cents for solar projects, was a limited offer and expired in June 2010, but was restarted again in October 2010. The program had approximately 20 participants in June and none of them were solar energy producers.[92] The program has a cap but Duke will not reveal the cap level. The lack of transparency and certainty in this program likely does not inspire investor confidence.

Incorporating a FIT into an RPS is may be more complex than running RPS and FIT programs in parallel. REC values are determined by market forces; therefore, it is not certain that the sum of the avoided cost plus the REC value will produce sufficient revenue to drive investment in certain renewable resources or ownership models. One solution is for a state to create a class of technology-specific REC to support a certain level of payment. New Jersey and Arizona have taken this approach in providing compensation for technology-specific or ownership model-specific RECs.[93]

The North Carolina REPS-regulated utilities do not meet their first overall target compliance date until 2012, therefore it is likely premature to consider this solution until there is an indication that the utilities are not meeting their overall target, or technology/resource-specific set-asides. In the meantime, clean energy advocates should encourage Duke and PEC to provide programs that are more transparent and certain to incent more small scale renewable energy development in the state.

[91] A PBF-funded FIT, with administratively set rates, may work best for small solar projects as developers of smaller projects may not be able to absorb the transaction cost of a competitive bidding or auction process.
[92] Conversation with Duke Staff person, Steve W. Smith, September 2010.
[93] N.J.A.C. § 14:8-2.3; (creating differentiated solar RECs); AAC R-14-2-1805 (creating differentiated distributed generation RECs).

Option 5: FIT based on RAM procurement

TVA, North Carolina, and Florida could implement a FIT program with prices exceeding avoided cost utilizing a market-based auction procurement program. TVA could establish such a program with approval from TVA's Board of Directors. The NCUC may have authority under the REPS statute to implement a RAM procurement system; if not, statutory change would be required in North Carolina. Similarly, a Florida RAM-procurement FIT program would require statutory changes.

TVA: TVA could most directly institute a RAM procurement FIT policy because it is not subject to the FPA for wholesale power purchases and could recover the value of power purchases above its avoided cost through its rate base. TVA has an existing program that could be the basis of a RAM procurement FIT program. The recently announced RSO program offers a payment at an average price of about 5.6 cents / kWh for projects from 201 kW to 20 MW.[94] The capacity of this new program is 100 MW.

That price point may incent some biopower project development, but anecdotal evidence suggests that it will not support solar development. A successful alternative design might include increased funding for the program to support higher price points. Additionally, the program could utilize a RAM procurement process for the three eligible technologies: biopower, wind and solar. The rate impacts from the increase in funding could be mitigated by a RAM procurement system that will inject competition and will drive down prices in the rates paid to project owners. A TVA RAM program would have the benefit of not requiring a distinct funding source, such as a PBF, and therefore more politically practicable.

The alternative program design would not be a considerable departure from the current design. Yet, it is more politically realistic to change the design of an already-existing program than advocate for new program – which would be required in North Carolina and Florida. Moreover, the failure of the current price points to drive renewable energy development might come become quickly apparent to the TVA Board. It is not unreasonable to expect that the program design may be revisited at some point in the future.

Therefore, the RSO program with design changes that include increased funding and a RAM procurement mechanism is a top recommendation of this report because: TVA's reach into seven states elevates the importance of TVA-driven renewable energy programs; it provides immediate advocacy opportunity around an already-existing program; and the proposed alternative design is not big departure from current design.

North Carolina: A North Carolina RAM could not procure bids above the utility's avoided cost without a funding source. North Carolina has an existing cost-containment mechanism in the REPS framework that funds prices above avoided cost through RECs. This mechanism could be used to fund a RAM, although it is not clear the funding source

[94] TVA. TVA Renewable Standard Offer Fact Sheet, October 8, 2010.

could support a concurrent FIT program. The success of the North Carolina REPS is not yet apparent, since the first compliance target date is 2012. Therefore, it is premature to recommend a RAM procurement FIT policy for North Carolina until there is more clarity on the success of the REPS program.

Florida: The state of Florida currently has no mechanism to fund a FIT, whether administratively set or set by RAM. Therefore, Florida policy makers have two options. First, the state could establish policy that renewable project owners who procured a contract through a RAM could seek from FERC a blanket approval to enter contracts at will, at whatever price the RAM process produces. The individual project owner can also ask for approval for individual transactions. For blanket approval, the seller must submit a detailed technical study proving that it has no "market power," i.e., no ability to set and sustain prices above competitive (i.e., just and reasonable) levels, in the markets in which the seller intends to sell.[95] However, seeking FERC approval of contracts would appear to be cost-prohibitive for all except the largest market participants.

Secondly, the state could create a funding source through a PBF. There are 23 states that use a PBF to promote renewable energy, although the Southeast states are not among them.[96] A PBF may represent a simpler path forward to state legislative leaders who have little experience with the tax credit option or RECs. Customer bill impacts from a Florida PBF could be mitigated through a RAM procurement design since it would inject competition that will drive down prices paid to renewable energy project owners.

Yet, economically conservative lawmakers may be reluctant to create an additional charge on customer's electricity bills during an economic recession. Therefore, a PBF funded FIT, even with a RAM procurement process, is not a top recommendation, but is worthy of consideration as an option as opportunities arise in Florida.

***Option 6*: TVA GP**

The TVA GP program is unique in that it offers a FIT payment for energy delivered to the distribution or transmission grid *and* consumed onsite. The program has approved contracts for approximately 60 MW from about 500 renewable energy projects. The program provides a foundation for rapidly deploying smaller scale renewable energy systems and should be supported through increased funding.

TVA should be encouraged to increase its $50 million funding cap of its GP program. While TVA is still operating under its funding cap, it is not clear how long this will be the case. The program, based partly on a generation cost-based considerations, has been successful in procuring significant smaller-sized renewable energy contracts. While this is a step in the right direction in the Southeast region, the GP program $50 million

[95] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 14, January 2010. It would be ideal if FERC could establish that a state RAM program is designed in a way that does not provide market power to the seller which leads to prices at "just and reasonable" levels, thereby automatically approving succeeding RAM transactions under the program.
[96] *Id.*

funding cap should be increased to allow for more project participation leading to a greater amount of renewable energy deployment. Given TVA's large service territory, expanding the existing GP program would extend greater opportunities for renewable development to seven states and should be a priority option in the region. Therefore, increased finding of the program is one of the top recommendations of this report.

Option 7: Municipal FIT programs

Municipal FIT programs are a top recommendation of the report because they offer the path of least resistance from a political and regulatory standpoint since they can be implemented with no statutory changes. In some Southeast states, municipal utilities serve a significant portion of the state's customer base. While current municipal FIT and production-based incentive programs in the Southeast are small in scale, if scaled-up and replicated, they can drive meaningful renewable energy development in the region.

A FIT program, at above avoided cost, is most directly deployed in the U.S. through publicly owned utilities. Such utilities can purchase electricity in the wholesale market above their avoided costs without implicating FERC jurisdiction. Publicly owned utilities are free from having to design elaborate funding policies that IOUs are subject to, such as funding through RECs, tax credits or PBF revenues in order to remain within PURPA obligations. Therefore, municipalities could move relatively quickly to implement such programs.

The most notable municipal FIT program in the region is the GRU FIT program. The generation cost-based FIT design is the basis for the GRU FIT program and many others throughout the world. Under the generation cost model, the renewable energy project owner is compensated through a long term standard offer contract with a payment intended to reflect the estimated cost of generation plus a stipulated rate of return. This model has deployed impressive amounts of renewable energy capacity throughout the world. Gainesville, for instance, has deployed over 3 MW of small-scale solar PV since the introduction of its program last year, and is on target to deploy 32 MW of solar PV by 2017.[97] Yet all municipal utilities in the region have not followed this model.

The OUC Solar Pilot Program has a price point, at 5 cents /kWh for solar PV that is only consumed onsite. This is a relatively low rate compared to other FIT programs. OUC has recently exhibited a commitment to expanding its program by removing its program cap. The program is an incremental improvement from a basic net metering program and has encouraged over 1.5 MW of solar development. This is a relatively low amount of deployment compared to the GRU and TVA GP programs. Nevertheless, it provides a model for other municipal utilities that may not want to engage in a generation-cost based FIT and deserves further consideration.

[97] Direct procurement may be the best policy for large scale solar or biomass by municipal utilities. A municipal RAM procurement system for larger renewable projects generally will not have the necessary level of aggregate market opportunity to solicit many bids. Gainesville Regional Utilities (GRU) recently directly procured a 100 MW biomass plant by negotiating terms and conditions with a chosen developer for a project to be built on GRU property.

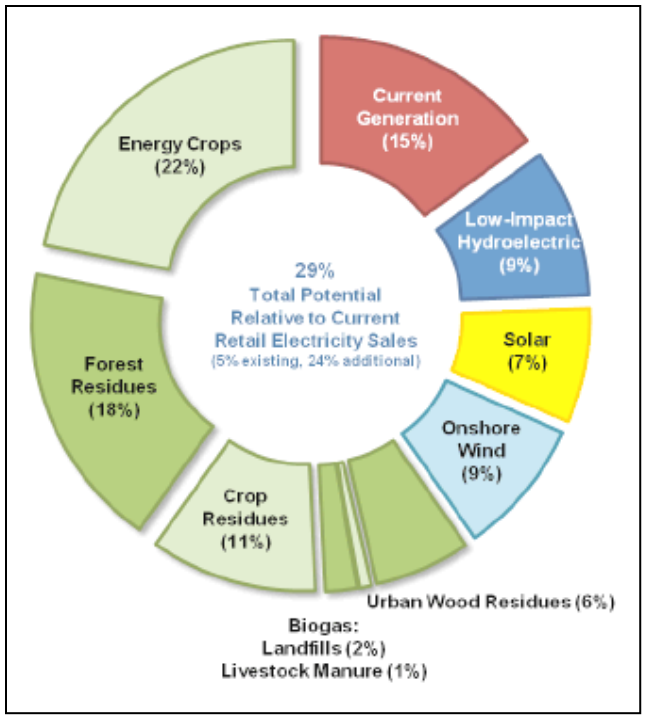
Appendix A

Southern Region Renewable Resources

Overview of Renewable Resources in the Southeast

The Southeast possesses a variety of renewable energy resources, including biomass, solar and wind. Yet these resources have not been developed to comprise a meaningful portion of the region's energy mix. Biomass is the region's most important near-term option. Today, biomass and hydroelectric power are equally responsible for nearly all of the Southeast's renewable energy generation. Biomass represents about two-thirds of the Southeast's near-term potential for expanding renewable energy.[98]

Near Term Renewable Energy Resource Potential in the Southeast



Source: Southern Alliance for Clean Energy

[98] Southern Alliance for Clean Energy, *Yes We Can: Southern Solution for a National Renewable Energy Standard*, p. 2, February 12, 2009.

Biomass Resources

Total feasible capacity in biomass combined for Florida, North Carolina and Tennessee is over 6,000 MW. Each state has over 2,000 MW of feasible capacity in biomass production.[99] The biomass resource is typically categorized as solid biomass, landfill gas, and anaerobic digestion. The fuel source for solid biomass includes forest production, crop residues, urban wood residues and energy crops. The following table highlights the potential of biomass in all Southeast states.[100]

Biomass Resource Potential in Southeast

Biomass	SE 11	SE 8	AL	AR	FL	GA	KY	LA	MS	NC	SC	TN	VA
Total Potential Capacity (MW)	92,906	70,825	10,861	8,634	6,727	12,175	5,674	7,773	13,137	9,111	6,502	6,651	5,660
Projected Feasible Capacity (MW)	27,515	20,346	3,028	2,559	2,380	3,049	2,120	2,490	4,512	2,332	1,561	2,091	1,393
Projected Feasible Generation (GWh	204,878	151,496	22,548	19,053	17,721	22,703	15,785	18,544	33,597	17,364	11,624	15,569	10,371
Current Generation (GWh)	23,925	18,925	3,489	1,634	4,128	3,394	458	2,908	1,415	1,759	1,881	404	2,455
Total Potential Generation (GWh)	228,803	170,421	26,036	20,687	21,849	26,097	16,243	21,452	35,012	19,123	13,504	15,973	12,826
Total Potential Capacity (MW)													
Forest Production	56,694	45,691	7,142	4,853	3,471	9,102	2,218	3,932	5,889	6,887	4,898	3,783	4,518
Crop Residues	10,866	5,374	197	2,416	1,643	502	893	2,183	1,104	752	167	756	253
Urban Wood Residues	3,510	2,884	243	158	845	465	229	239	155	420	38	309	409
Livestock Manure	435	350	43	66	9	63	16	3	33	169	14	9	11
Landfills	1,174	979	108	5	209	92	114	76	42	195	83	125	126
Energy Crops	20,227	15,546	3,128	1,135	550	1,950	2,205	1,341	5,914	688	1,303	1,668	344
Total	**92,906**	**70,825**	**10,861**	**8,634**	**6,727**	**12,175**	**5,674**	**7,773**	**13,137**	**9,111**	**6,502**	**6,651**	**5,660**
Projected Feasible Capacity (MW)													
Forest Production	8,417	6,783	1,060	721	515	1,351	329	584	874	1,023	727	562	671
Crop Residues	4,890	2,418	89	1,087	740	226	402	983	497	339	75	340	114
Urban Wood Residues	2,808	2,308	195	127	676	372	183	191	124	336	30	247	328
Livestock Manure	348	280	34	53	7	51	12	2	26	135	11	7	8
Landfills	939	783	86	4	167	73	91	61	34	156	66	100	100
Energy Crops	10,113	7,773	1,564	568	275	975	1,102	670	2,957	344	652	834	172
Total	**27,515**	**20,346**	**3,028**	**2,559**	**2,380**	**3,049**	**2,120**	**2,490**	**4,512**	**2,332**	**1,561**	**2,091**	**1,393**
Projected Feasible Generation (GWh)													
Forest Production	62,673	50,509	7,895	5,365	3,837	10,062	2,452	4,347	6,510	7,614	5,415	4,182	4,994
Crop Residues	36,408	18,008	660	8,094	5,507	1,683	2,991	7,316	3,698	2,521	559	2,533	847
Urban Wood Residues	20,909	17,182	1,449	942	5,034	2,772	1,362	1,422	921	2,499	225	1,842	2,439
Livestock Manure	2,590	2,086	256	394	52	378	93	16	196	1,007	82	54	63
Landfills	6,994	5,832	642	30	1,243	547	680	451	253	1,161	492	745	748
Energy Crops	75,304	57,878	11,646	4,227	2,048	7,261	8,207	4,991	22,019	2,562	4,851	6,212	1,279
Total	**204,878**	**151,496**	**22,548**	**19,053**	**17,721**	**22,703**	**15,785**	**18,544**	**33,597**	**17,364**	**11,624**	**15,569**	**10,371**

[99] *See also* Florida Department of Agriculture and Consumer Services, *Woody Biomass Economic Study*, March 1, 2020 (Biomass generation could help meet an RPS target of 12 percent or more in Florida with increased reforestation and planting of high-yielding short rotation woody crops – without significant impact to existing forest industries).

[100] Southern Alliance for Clean Energy, *Yes We Can: Southern Solution for a National Renewable Energy Standard*, p. 11, February 12, 2009.

Solar Resources

Southeast states also possess good solar resources. The National Renewable Energy Laboratory (NREL) map of photovoltaic resource in the U.S. indicates that, in some Southeast states, the solar PV resource is only second to the U.S. Southwest. [101] For instance, the solar PV projected feasible capacity for roof-top solar PV and ground mounted solar PV in Florida is 1,047 MW and 8,458 MW respectively. The potential in North Carolina for ground mounted solar PV potential is over 7,000 MW, and in Tennessee, almost 6,000 MW of ground mounted solar PV potential.[102] The following table highlights the solar PV potential throughout the Southeast.

Solar Resource Potential in Southeast[103]

Solar	SE 11	SE 8	AL	AR	FL	GA	KY	LA	MS	NC	SC	TN	VA
Total Potential Capacity (MW)	545,476	423,787	48,567	42,136	90,516	65,187	38,282	41,271	39,768	55,628	32,022	45,851	46,249
Projected Feasible Capacity (MW)	79,298	58,951	8,256	7,747	9,826	8,790	5,843	6,758	7,397	7,691	4,664	6,438	5,888
Projected Feasible Generation (GWh)	166,799	124,071	17,821	16,550	21,532	18,668	11,546	14,632	15,609	15,798	9,895	12,824	11,924
Current Generation (GWh)	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Potential Generation (GWh)	166,799	124,071	17,821	16,550	21,532	18,668	11,546	14,632	15,609	15,798	9,895	12,824	11,924
Rooftop PV													
Total Potential Capacity (MW)	190,757	163,595	12,500	6,128	52,000	24,921	10,079	10,955	6,846	21,545	11,042	16,053	18,689
Projected Feasible Capacity (MW)	3,057	2,834	276	3	1,047	130	111	108	292	489	136	267	197
Projected Feasible Generation (GWh)	4,819	4,480	442	5	1,730	202	163	171	455	746	213	398	293
Ground Mounted PV													
Total Potential Capacity (MW)	346,127	253,256	34,816	35,725	37,000	39,730	27,258	29,888	32,184	33,421	20,659	28,280	27,166
Projected Feasible Capacity (MW)	74,391	54,624	7,709	7,683	8,458	8,544	5,528	6,557	6,946	7,059	4,458	5,843	5,606
Projected Feasible Generation (GWh)	159,481	117,517	17,010	16,462	19,263	18,307	11,169	14,334	14,936	14,856	9,587	12,030	11,527
Large Scale Solar Water Heating													
Total Potential Capacity (MW)	8,212	6,556	1,251	283	1,136	535	945	428	738	662	321	1,518	394
Projected Feasible Capacity (MW)	1,775	1,417	270	61	246	116	204	93	160	143	69	328	85
Projected Feasible Generation (GWh)	2,348	1,923	369	84	387	158	215	127	218	195	95	397	103
CSP - feasibility limited to Florida due to need for direct incidence of sunlight													
Total Potential Capacity (MW)	380	380			380								
Projected Feasible Capacity (MW)	75	75			75								
Projected Feasible Generation (GWh)	151	151			151								

[101] National Renewable Energy Laboratory, at: http://www.nrel.gov/gis/solar.html.
[102] Southern Alliance for Clean Energy, *Yes We Can: Southern Solution for a National Renewable Energy Standard*, p. 12, February 12, 2009.
[103] *Id*. The most authoritative analysis of solar energy potential in the Southeast is the *Florida Renewable Energy Potential Assessment* (Navigant Consulting 2008). All Florida data for the solar energy resource are derived from this study, which used three policy and forecast scenarios that resulted in different levels of renewable energy potential. In response to this study in January 2009, the Florida Public Service Commission recommended a RPS of 20% by 2020. Using a weighted average of two scenarios, the solar resource potential for Florida was estimated for an overall 20% renewable energy potential as recommended by the commission; these data are used in this report. Since there is no comparable data for any other Southeastern state, the Florida study findings were extended to other states using technology-specific adjustment factors.

Wind Resources

Wind resources in the Southeast are not created equal. Florida onshore wind resources are limited, yet offshore wind resources in Florida show potential. Onshore wind resources in both North Carolina and Tennessee are significantly viable. While Florida's onshore wind power is classified as a minimal "Class 1" resource,[104] North Carolina wind power is classified as a more viable "Class 3" resource on the Eastern coast and in the western mountains.[105] Tennessee has "Class 2" wind resources in the Eastern mountainous section of the state.[106] Unlike Florida, North Carolina and Tennessee can rely on onshore wind resources to meet renewable energy goals. Onshore wind resources can be a reliable eligible technology in a FIT program in North Carolina and Tennessee, whereas Florida may have to rely more heavily on biomass as a near-term renewable resource.

The greatest long-term wind resource in the region may ultimately be offshore. A 2010 NREL report estimates that about 300 GW of offshore wind capacity potential exists off the North Carolina coast alone.[107]

Wind Resource Potential in the Southeast[108]

Wind (Total)	SE 11	SE 8	AL	AR	FL	GA	KY	LA	MS	NC	SC	TN	VA
Total Potential Capacity (MW)	564,959	554,998	-	9,655	40,486	76,200	306	-	-	155,874	150,693	4,395	127,350
Projected Feasible Capacity (MW)	193,496	190,209	-	3,186	661	18,740	101	-	-	78,646	43,665	2,089	46,409
Projected Feasible Generation (GWh)	678,068	670,584	-	7,256	2,155	56,423	228	-	-	274,440	169,931	4,645	162,989
Current Generation (GWh)	36	36	-	-	-	-	-	-	-	-	-	36	-
Total Potential Generation (GWh)	678,104	670,620	-	7,256	2,155	56,423	228	-	-	274,440	169,931	4,681	162,989

Onshore Wind Resources

Onshore	SE 11	SE 8	AL	AR	FL	GA	KY	LA	MS	NC	SC	TN	VA
Total Potential Capacity (MW)	70,911	60,950	-	9,655	186	4,728	306	-	-	15,777	924	4,395	34,940
Projected Feasible Capacity (MW)	14,106	10,819	-	3,186	49	1,560	101	-	-	4,857	305	2,089	1,959
Projected Feasible Generation (GWh)	33,166	25,682	-	7,256	86	3,635	228	-	-	11,882	679	4,645	4,753

[104] NREL, Wind Energy Resource atlas, at: http://rredc.nrel.gov/wind/pubs/atlas/maps/chap3/3-36m.html.
[105] *Id.* at: http://rredc.nrel.gov/wind/pubs/atlas/maps/chap3/3-30m.html.
[106] *Id.* at*:* http://rredc.nrel.gov/wind/pubs/atlas/maps/chap3/3-31m.html.
[107] Schwartz, et al., Assessment of Offshore Energy Wind Resources for the United States, June 2010.
[108] Southern Alliance for Clean Energy, *Yes We Can: Southern Solution for a National Renewable Energy Standard*, p. 14, February 12, 2009.

Recent Renewable Energy Development

Recent renewable energy projects in the Southeast are testament to the region's ability to meaningfully expand electricity generation from renewable energy resources. The states in the region need only the appropriate policies to rapidly develop renewable resources.

FPL solar plants
Florida Power and Light (FPL) recently has completed two large centralized solar PV projects of 25 MW and one of 10 MW. Additionally, a 75 MW concentrated solar thermal system will soon be completed on the grounds of FPL's Martin County combined cycle natural gas plant. The solar thermal component will help the utility meet peak electricity demand with clean, renewable energy.[109]

GRU FIT
Gainesville Regional Utilities (GRU) has added almost 3 MW of solar PV generation through its FIT program in its first year of implementation.[110] The program is aiming to add a total of 32 MW of solar PV to GRU's system by 2017.

GRU biomass plant
GRU recently gained FPSC approval for a 100 MW biomass plant. The biomass burned in the plant will come from the leftover waste wood of timber harvesting operations and other indirect sources such as urban vegetation management.[111]

Duke distributed solar PV
Duke announced that it has completed Phase 1 of its distributed solar PV program installing 4.3 MW and is expected to install another 4.1 MW by early 2011.[112]

Tennessee solar
Natural Energy Group completed installation of what by all accounts will be the state's first one-megawatt solar system in 2010. This system consists of 4,608 Sharp modules manufactured in Memphis, Tennessee. An economic analysis estimates that the project created 765 jobs.[113]

Jacksonville solar
JEA signed a purchase power agreement with Jacksonville Solar, LLC in May 2009 to provide energy from a 15 MW solar farm that commenced operation in September 2010.

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[109] FPL Next Generation solar energy centers, at: http://www.fpl.com/environment/solar/projects.shtml.
[110] GRU, *Increasing use of Renewable Energy Resources*, at: http://www.gru.com/OurCommunity/Environment/renewGRU.jsp.
[111] GRU, *GRU Chooses 100 MW Biomass Plant*, at: htp://www.gru.com/AboutGRU/NewsReleases/Archives/Articles/news-2008-05-23.jsp
[112] Duke Energy, *North Carolina Solar Distributed Generation*, at: http://www.duke-energy.com/north-carolina/renewable-energy/nc-solar-distributed-generation-program.asp.
[113] Efficient Energy of Tennessee, *Area Energy Firm Hopes Solar Power Partnership Works Out*, at: http://www.eetenn.com/Articles/area_energy_firm_hopes_solar_power_partnership_program_works_out.aspx

The facility is located in western Duval County and consists of approximately 200,000 photovoltaic panels on a 100 acre site.[114]

OUC Stanton Solar Farm

The Orlando Utilities Commission (OUC), one of the largest municipal utilities in Florida, has announced the development of almost 10 MW of solar PV at its Stanton Energy Center. The solar power will be procured through a purchase power agreement with project developer Regenesis Corporation. The groundbreaking is scheduled for March 2, 2011.[115]

[114] PR Newswire, *PSEG and JEA Dedicate Jacksonville Solar*, at: http://www.prnewswire.com/news-releases/pseg-and-jea-dedicate-jacksonville-solar-103923163.html.
[115] Communication with Regenesis Corporation representative, Dell Jones (February 2011).

Appendix B

Profiles, Policies, Challenges and Opportunities in the Southeast

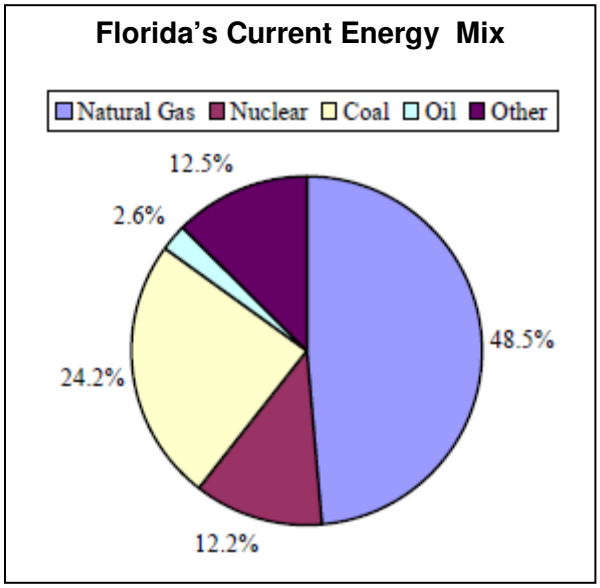
For purposes of this report, three states have been chosen to represent the energy mix, statutory framework and renewable energy programs in the Southeast. Florida was chosen based on the sheer size of its renewable energy market and because the state has contemplated a comprehensive renewable energy policy since 2007. Tennessee is home to the TVA, the largest government-owned utility entity in the country. It is the largest seller of wholesale power in the region and has gained notoriety from its TVA Generation Partners (GP) FIT program. Finally, North Carolina is the only state in the Southeast with a RPS policy, called a Renewable and Efficiency Portfolio Standard (REPS). Lessons learned in the North Carolina RPS implementation may provide insight into entry points for FIT incorporation into an RPS.

I. Florida

Energy profile

Florida to date has no RPS policy, although it can boast the nation's first generation cost-based FIT program implementation in the City of Gainesville. The state is highly reliant on natural gas as a fuel source for the generation of electricity. While Florida statute has renewable energy legislative intent language promoting renewable energy goals, it has yet to pass policy to implement the stated goals. The state's IOUs, FPL, Progress Energy Florida (PEF), Tampa Electric Company (TECO) and Gulf Power Company, are vertically integrated investor-owned utilities and regulated by the Florida Public Service Commission (FPSC). There are 34 municipal electric utilities in the state, and they serve approximately 2.8 million Floridians, or 25 percent of Florida's population.[116] There are 15 electric cooperatives in Florida serving about 1 million customers.[117]

[116] Florida Municipal Electric Association, at: http://www.publicpower.com/fmea_utilities.shtml (last visited October 15, 2010).
[117] Florida Electric Cooperative Association, at: http://www.feca.com/index.html (last visited October 15, 2010).



Source: Florida Public Service Commission

Florida's energy mix incorporates little renewable energy. Much of the current Florida Renewable energy mix is comprised of biomass – mostly municipal solid waste (MSW). The biomass development to date includes: 520 MW of MSW, 191 MW from agricultural waste, and 55 MW from landfill methane operations.[118] Non-hydro renewable energy resources accounted for 1.8 percent of capacity in 2008.[119]

FPL recently added 110 MW of solar powered generation. The recent additions came courtesy of a provision in a 2008 Florida energy bill that granted guaranteed cost recovery to Florida's IOUs for 110 MW of renewable energy development in order to "demonstrate the feasibility and viability of clean energy systems."[120]

Florida's largest utilities are planning to meet baseload demand beyond 2018 with nuclear reactors. Both FPL and PEF have each garnered a certificate of need from the FPSC for two AP-1000, 1,100 MW reactors. Both utilities have pushed the completion dates pushed back by several years due presumably to a drop in electricity demand caused by the economic recession. Both projects are facing legal challenges before the FPSC for the prudency of expenditures submitted for cost recovery and before the Nuclear Regulatory Commission (NRC) for construction and operating licenses. It is not clear yet whether the projects will be constructed. Florida Power and Light has stated publicly that it will not make a final decision to proceed with the projects until 2012.[121] If the projects are not completed, it would invariably leave more room for demand to be met with energy efficiency and renewable resources.

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[118] Navigant Consulting, Inc., Florida Renewable Energy Potential Assessment, December 30, 2008.
[119] Energy Information Administration, *Florida Renewable Electricity Profile*, at: http://www.eia.doe.gov/cneaf/solar.renewables/page/state_profiles/florida.html.
[120] § 366.92(4) Fla. Stat. (2008).
[121] FPL Petition for Approval of Nuclear Power Plant cost Recovery Amount for the Period January to December 2011, Docket No. 100009, p. 8, May 3, 2010.

Florida will generate more than 50 percent of its electricity from natural gas by 2018 if it continues business as usual.[122] The reliance on natural gas could place Florida ratepayers at risk of bill prices spikes given the historical volatile nature of natural gas prices.

In 2008, the wellhead of natural gas spiked from $5.32 per thousand cubic feet in 2007 to $11.32 in 2008.[123] At that time, the state's largest utilities announced substantial bill increases to recover expenditures for spiking fuel costs. PEF announced a bill increase of 25%, while FPL asked for a bill increase of 16% and TECO following suit with a 12% percent increase.[124] Hence, the state would benefit from energy mix diversification with renewable energy development.

Statutory framework

Florida renewable law is at best not clear, and at worst, dissuades renewable development. It provides neither financial incentive nor certainty for non-utility power, third party providers of renewable energy. In keeping with PURPA requirements, Florida Statute Section 366.051, states that a utility must purchase power from small power producers at the utilities' "full avoided cost." Renewable energy developers have voiced concern that the avoided cost price point is too low for an adequate return on investment to make projects financially viable and that the terms are too onerous.[125]

Florida law states the importance to the state of meeting renewable energy objectives, yet provides no mechanism for meeting the objectives. For example, Florida Statute §366.91 (defining renewable energy, mandating interconnection agreements and requirement for continuous offer of purchased power at avoided cost) states that: "the Legislature finds that it is in the public interest to promote the development of renewable energy resources in this state." The legislature continues to state in Florida Statute §366.92:

> It is the intent of the Legislature to promote the development of renewable energy; protect the economic viability of Florida's existing renewable energy facilities; diversify the types of fuel used to generate electricity in Florida; lessen Florida's dependence on natural gas and fuel oil for the production of electricity; minimize the volatility of fuel costs; encourage investment within the state; improve environmental conditions; and, at the same time, minimize the costs of power supply to electric utilities and their customers."

Yet, no policy is in place that can help the state successfully reach its goals. Florida statute defines renewable resources as:

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[122] Florida Public Service Commission, *Review of 2010 Ten Year Site Plans*, Oct. 2009. Natural gas will represent 51.4% of Florida's energy mix by 2019.
[123] U.S. Energy Information Administration, Natural Gas Wellhead Price, at: http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3m.htm.
[124] Progress Energy press release, *Progress Energy Estimates Fuel, Nuclear and Environmental Compliance Costs*, August 29, 2008, at: www.progress-energy.com/aboutus/news/article.asp?id=19482.
[125] Wheelabrator Technology Inc. Protest of Order No. Florida PSC-080544, September 9, 2008.

> . . . electrical energy produced from a method that uses one or more of the following fuels or energy sources: hydrogen produced from sources other than fossil fuels, biomass, solar energy, geothermal energy, wind energy, ocean energy, and hydroelectric power. The term includes the alternative energy resource, waste heat, from sulfuric acid manufacturing operations.
>
> Section 366.91(d), Fla. Stat. (2008)

Programs in Florida

Production-based incentives

The state's utilities offer Power Purchase Agreements (PPA) to small renewable energy providers and cogenerators, pursuant to their PURPA QF obligations. In addition, the Florida utilities offer net metering programs, a Lakeland Utilities water heating program, the OUC Solar Pilot Program and the GRU FIT program.

QF program: The incumbent retail utility is only obligated, pursuant to the PURPA to enter into contracts with developers of small renewable energy projects and cogeneration facilities – termed qualifying facilities (QF). Under the PPA-QF model, the electricity generator secures funding for the project, maintains and monitors the energy production, and sells the electricity to the utility at a contractual price for the term of the contract. The term of a PPA generally lasts between 5 and 25 years. One of the key benefits of the PPA is that the electricity generator can use the expected revenue stream to procure financing to construct the project.

Since January 1, 2006, each IOU has been required to continuously offer to purchase capacity and energy from specific types of renewable resources. Florida Statute § 366.91(3), specifies that the contracts for purchase must be based on the utility's full avoided cost and provide a term of at least ten years.

Net metering: Net-metering enables customers to use their own generation to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity in excess of their demand. This offset means that customers receive retail prices for the excess electricity they generate and consume. In March 2008, the FPSC adopted rules for net metering and interconnection for renewable-energy systems up to 2 MW in capacity. The Florida net metering and interconnection rule is considered one of the most favorable rules in the nation, earning Vote Solar's Golden Meter Award in 2008.[126] Net metering requirements were later extended to the state's municipal utilities and electric cooperatives. Net metering is available to

[126] Interstate Renewable Energy Council, *Florida Governor Crist Receives Golden Meter Award*, at: http://irecusa.org/2009/04/florida-governor-crist-receives-%E2%80%9Cgolden-meter%E2%80%9D-award.

customers who generate electricity using solar energy, geothermal energy, wind energy, biomass energy, ocean energy, hydrogen, waste heat or hydroelectric power.

Customer net excess generation is carried forward at the utility's retail rate to a customer's next bill for up to 12 months. At the end of a 12-month billing period, the IOU pays the customer for any remaining net excess generation at the utility's avoided-cost rate. RECs are the property of the system owner, and customers may sell RECs back to the utility.[127]

Lakeland solar water heating program: Lakeland Electric, a mid-size municipal utility in Florida, is the nation's first utility to offer solar-heated domestic hot water on a "pay-for-energy" basis. The utility owns and maintains (through a solar company) the solar water heaters they install on participating customers' homes and bills them a flat monthly fee of $35. The program hopes to install 10,000 units in the next four years.[128]

OUC Pilot Solar Program: OUC, through its Pilot Solar Program, offers to purchase the RECs from customers who install a solar PV and/or solar thermal energy system on their property. Its FIT payment is 5 cents /kWh for solar PV. The solar PV project receives the tariff for PV-generated electricity consumed onsite, with any excess credited to the customer at the full retail rate. The payment term is 5 years and will renew for successive 5 year terms unless terminated by either party.[129]

Under this program, the electricity output of the PV system is used on-site and REC payments are based on the system's total output. Any net excess generation produced by PV systems is credited to the system owner at the utility's full retail rate. OUC offers customers low-interest loans for installation financing.

As part of its Solar Pilot Program, OUC provides an incentive payment for solar *water* heating systems of 3 cents / kWh. The solar thermal system payment converts British Thermal Units (BTU) created by the system to a kWh equivalent. The payment term is 5 years and will renew for successive 5 year terms unless terminated by either party.

The OUC program is a hybrid of net metering and production based incentive. The incentive, on top of displacing energy use (at retail rate) represents significantly higher compensation for the system owner than a simple net metered program.

Gainesville FIT program: GRU implemented the first generation cost-based FIT program in the country in 2009. It offers a long term solar PV FIT payment intended to reflect the cost of generation plus a stipulated rate of return. The payment is solely for power delivered to the transmission and distribution system. GRU customers cannot concurrently participate in the met metering program and the FIT program. The program

[127] Florida Rule 25-6.065, F.A.C. (2008).
[128] Asjylyn Loder, *Lakeland Electric has Plan to Increase Solar Power*, St Petersburg Times, March 1, 2009.
[129] OUC. *OUC's Solar Pilot Program*, at: http://www.ouc.com/en/conservation_initiatives/renewables/solar.aspxhttp://www.ouc.com/en/conservation_initiatives/renewables/solar.aspx

was fully subscribed for its first year target of 4 MW. The next round of application submissions for 2011 capacity and tariffs opened in January 2011 and were quickly fully subscribed. An independent third-party selected 55 projects for inclusion by random drawing.

The 2011 tariff payments are offered for 20 years and consist of: 32 cents / kWh for systems 10 kW or less that are roof mounted or over pavement; 29 cents / kWh for systems greater than 10 kW to 300 kW that are roof mounted or 10 kW to 25 kW that are ground mounted; and 24 cents / kWh for ground mounted systems greater than 25 kW to 1,000 kW.[130]

Non-production-based incentives

Sales tax exemption: Solar energy systems have been exempt from Florida's sales and use tax since July 1, 1997. The term "solar energy system" means the equipment and requisite hardware that provide and are used for collecting, transferring, converting, storing or using incidental solar energy for water heating, space heating and cooling, or other applications that would otherwise require the use of a conventional source of energy such as petroleum products, natural gas, manufactured gas or electricity. Vendors of solar energy systems or components are required to document exempt sales."[131]

Solar rebate program: The Solar Energy Systems Incentives Program, or the "solar rebate program," was created in 2006 by the Florida Renewable Energy Technologies and Energy Efficiency Act. The four-year program was designed to encourage residents and businesses to invest in solar energy technologies by providing rebates for purchase and installation of solar energy systems in homes and businesses. Prior to 2008, the solar rebate program was fully funded and paying a $4/watt rebate to applicants for solar PV. Due to the large volume of rebate applications, the state has exhausted the available funding in 2009. The Florida Legislature did not appropriate any funding during the 2010 legislative session for the rebate program, nor did it renew the popular program; instead allowing it to sunset on June 30, 2010. The fund has accrued a $52.7 million deficit.[132]

Demand-side renewable incentives: The Florida legislature, in 2008, amended statute to mandate more renewable energy to meet demand-side efficiency goals by the state's largest utilities.[133] During the 2010 goals setting proceedings, the FPSC executed the statutory change by requiring the state's IOUs to invest approximately $25 million annually for solar thermal and solar PV rebates.[134] The utility programs will consist of rebates for small-scale customer solar thermal and solar PV installation.

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[130] GRU, *Solar FIT*, at: https://www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp
[131] Database of State Incentives for Renewables and Efficiency, at http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=FL01F&re=1&ee=1.
[132] Christa Silva, St. Petersburg Times, *Florida Owes 52.7 Million Unpaid Solar Energy Rebates*, August 3, 2010.
[133] *See* §366.82, Fla. Stat. (2008) (Florida Efficiency and Conservation Act).
[134] FPSC Final Order, *In re: Commission review of numeric conservation goals*, Docket Nos. 080407-13.

There is also a host of utility-sponsored solar rebates offered by municipal utilities and electric cooperatives, mostly in the form of rebates for small-scale customer solar thermal installation.[135]

Grants Administered by the Florida Energy and Climate Commission[136]

Renewable Energy Technologies Grant program: The Renewable Energy Technologies Grants Program was originally established in 2006 by the Florida Renewable Energy Technologies & Energy Efficiency Act (Senate Bill 888) to provide renewable energy matching grants for demonstration, commercialization, research and development projects relating to renewable energy technologies. There are no funds remaining in the program as of November 2009.

Grant award winners from the 2008-2009 fiscal year included renewable energy, energy efficient and bioenergy technologies. The grant amounts ranged from $300,000 to $2.5 million.[137] Some renewable energy projects have been able to be funded for 2009-10 through the Shovel Ready Energy Grants program described below.[138]

Other Grants from 126.089 Million in Federal ARRA[139] *funding***:**

Solar for Schools & Shelters program ($10,000,000): This program will support the installation of photovoltaic systems with battery back-up on strategically located schools and emergency shelters throughout the state.

Shovel Ready Energy Project program ($19,517,700): This program leverages Florida's state energy grant initiatives to identify and fund "shovel-ready" projects that can be expeditiously implemented through available SEP funding.

Florida Clean Energy program ($22,993,461): The Clean Energy Grant program will provide funding to promote energy efficiency measures and renewable energy deployment for eligible public, not-for-profit, and agricultural entities.

Florida Energy Opportunity Fund - Clean Energy Investment Program (initially $36,089,000): The Florida Opportunity Fund – Clean Energy Investment Program is a direct investment program created to promote the adoption of energy efficient and renewable energy products and technologies in Florida.[140]

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[135] *See* Database of State Incentives for Renewables and Efficiency, at: http://dsireusa.org/incentives/index.cfm?re=1&ee=1&spv=0&st=0&srp=1&state=FL.

[136] The Florida Energy and Climate Commission (FECC) is an advisory body to the Florida legislature and governor and is housed in the Governor's Energy Office.

[137] The FECC, *Fiscal Year 2008-2009 Grants*, at : http://www.myfloridaclimate.com/climate_quick_links/florida_energy_climate_commission/state_energy_initiatives/state_energy_grant_program/fiscal_year_2008_2009_grants.

[138] Correspondence with Jim Murley, Chairman of the FECC, November 2010.

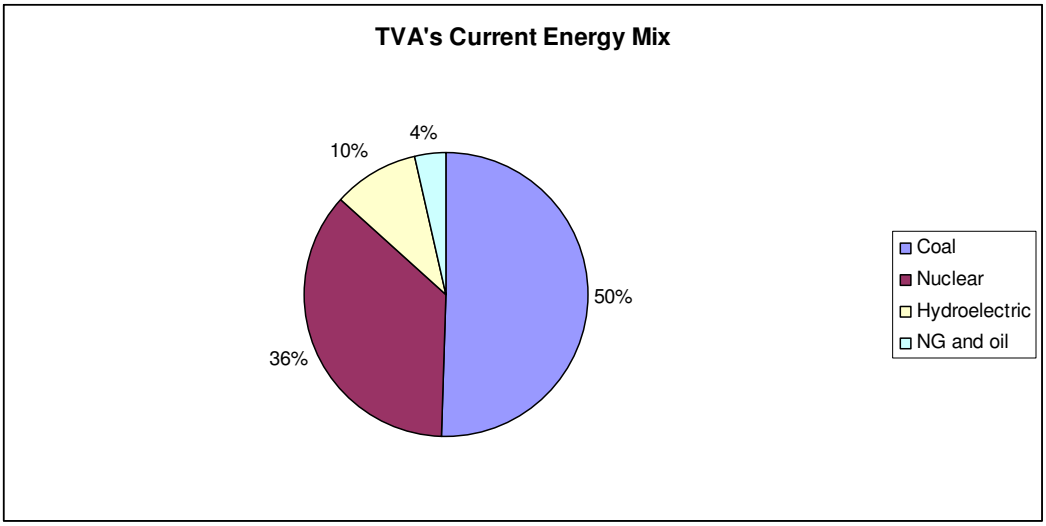
[139] The American Recovery and Reinvestment Act, at: http://www.recovery.gov/Pages/home.aspx. This is not a recurrent source of funding.

[140] Florida Opportunity Fund, at: http://floridaopportunityfund.com/HomePage.asp.

II. Tennessee / TVA

Energy Profile

TVA operates the nation's largest public power system, producing 4 percent of all electricity in the U.S. The agency serves an 80,000-square-mile region encompassing most of Tennessee and parts of Virginia, North Carolina, Georgia, Alabama, Mississippi, and Kentucky. The population of the service territory in 2008 was estimated to be 9 million people, with the number of customers served in 2008 of 4,571,600. TVA delivers electricity to 155 local power distributors and 58 directly served large industrial and federal facilities. TVA supplies almost all the electricity needs in Tennessee.[141]



Source: TVA, 2010 SEC 10-K Annual Report

TVA has approximately 450 MW of renewable capacity which includes 412 MW of incremental hydro. When you include TVA's existing conventional hydro, TVA's renewable capacity is approximately 3,830 MW.[142] Non-hydro renewable energy resources account for less than 1 percent of capacity in 2008.[143]

The capacity on the TVA power system is about 37,000 MW. TVA generates most of this power with three nuclear plants (consisting of 6 reactors), 11 coal-fired plants (consisting of 58 boilers), nine combustion-turbine plants (consisting of 87 units), 7 combined-cycle units spread out over 3 facilities, 29 hydroelectric dams, a pumped-storage facility, a wind farm, a methane-gas co-firing facility, and several small renewable generating

[141] TVA, *TVA in Tennessee*, at: http://www.tva.com/abouttva/pdf/tennessee.pdf.
[142] *Integrated Resource Plan, TVA's Energy and Environmental Future,* at: http://www.tva.gov/environment/reports/irp/pdf/clean_energy.pdf.
[143] Energy Information Administration, *Tennessee Renewable Electricity Profile*, at: http://www.eia.doe.gov/cneaf/solar.renewables/page/state_profiles/tennessee.html.

facilities. A portion of delivered power is obtained through long-term power purchase and lease agreements. TVA aims to have 50 percent of its overall power supply to come from zero or near-zero carbon emitting resources by 2020.[144]

TVA's non-hydro renewable portfolio also consists of 7 MW of wood waste co-firing at Colbert Fossil Plant, and 8 MW of biogas co-firing at Allen Fossil Plant. It owns three wind turbines on Buffalo Mountain for a total of 2 MW. Additionally TVA has a long term contract with Invenergy LLC, to purchase the output from their wind farm on Buffalo Mountain, which consists of fifteen wind turbines for a total of 27 MW. Its portfolio also consists of 2.2 MW of purchased landfill gas generation. All totaled, the 46.2 MW of non-hydro renewable resources is a small fraction of its 37,000 MW of overall generation capacity.

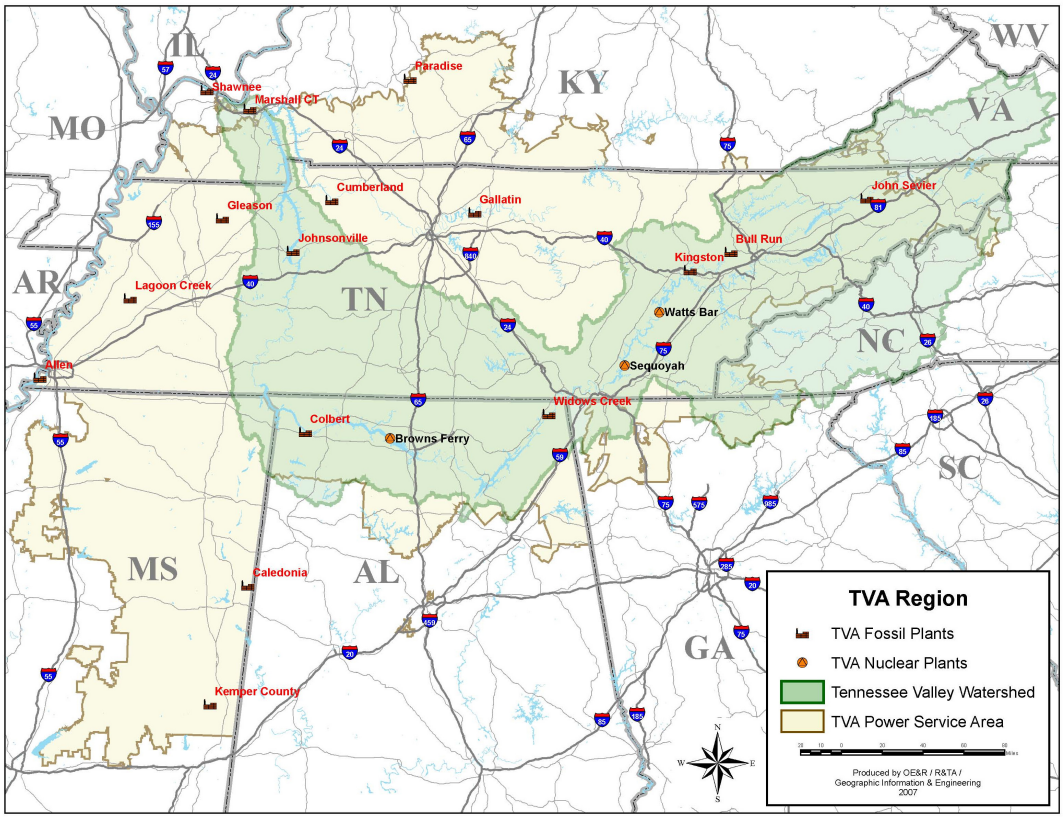
TVA's plans for additional generation are focused on the expansion of its nuclear generation fleet. Nuclear plants currently contribute 6,600 megawatts of electricity to its power grid. TVA's future nuclear plans include power up-rates of Browns Ferry Units 1, 2 and 3, and the completion of Watts Bar Unit 2. TVA has also filed with the NRC a combined operating license application for two nuclear reactors at the Bellefonte Nuclear Plant, although no final decision has been made to complete those units. If those units are not built, it would invariably lead to more room for demand to be met with energy efficiency and renewable resources.

TVA service territory

TVA's service area encompasses generally all of Tennessee. There are 88 distribution utilities in Tennessee that rely on TVA-generated power to provide service to their customers. TVA serves another 67 distribution utilities, either municipal or coop, in 6 other states: Mississippi, Alabama, Georgia, North Carolina, Virginia and Kentucky. Given TVA's service area, the discussion on TVA's Generation Partners program is applicable beyond Tennessee to a much larger geographic area of the southeastern U.S.

[144] *Integrated Resource Plan, TVA's Energy and Environmental Future,* at: http://www.tva.gov/environment/reports/irp/pdf/clean_energy.pdf.

TVA service territory map



Regulatory Framework

The TVA board serves as the regulatory arm of TVA and is charged with giving the agency strategic direction and ensuring compliance with applicable laws. There are nine members of the TVA Board that are appointed by the President and confirmed by the Senate. Currently only eight Board seats are filled, as one seat awaits a new appointee. Three additional seats will become open for new appointees in 2011. In all, by the end of his term, President Obama will have the opportunity to nominate new candidates for all nine seats on the TVA Board, presenting an important opportunity to directly address implementing renewable energy technologies.

TVA announced a new strategic vision, approved by the Board, on August 20, 2010. TVA's vision includes three components:[145]

1. Becoming the Nation's leader in improving air quality;
2. Becoming the Nation's leader in increased nuclear production; and
3. Becoming the Southeast's leader in increased energy efficiency.

[145] TVA, *TVA CEO Outlines TVA's Vision and Strategy for Future Operations*, at: http://www.tva.com/news/releases/julsep10/0820_board.html.

Towards that end, the TVA board approved four steps that will begin to move TVA towards achieving these goals:[146]

1. Phasing out 1000 MW of older, unscrubbed coal units by 2015;
2. Moving forward with the next phase of the Bellefonte nuclear project;
3. Increasing TVA's energy efficiency budget to $135 million in 2011, a 50% increase over 2010; and
4. Beginning the transition to time-of-use rates across the TVA service territory.

Programs in TVA's Territory

TVA offers a PURPA-QF program. As a wholesale power provider and regulator of its distributor customers, it was required to consider net metering as requirement of the Energy Policy Act of 2005.[147] After input from its distribution partners, however, TVA instead introduced a FIT program called Generation Partners, more fully discussed below, in lieu of net metering. It has additionally added the TVA Renewable Standard Offer (RSO) to encourage development of larger scale renewable projects.

Production-based incentives

QF program: The sale to TVA of any of the output of a QF is subject to the TVA Purchased Power Agreement (PPA) guidelines. If a QF is to be connected to a distribution system that is not owned by TVA and the QF elects to sell the output to TVA, it is the QF's responsibility, at its own expense, to make all necessary and appropriate arrangements with the connecting transmission and distribution system for delivery of the output to TVA.

If the QF elects to sell all or a portion of its output of to a distributor, arrangements for the sale is subject to the provisions of a purchase contract between the QF and the distributor and is subject to TVA guidelines.

Feed-in Tariff Programs

TVA Generation Partners: TVA's Generation Partners (GP) is a pilot end-use renewable energy program that gives homeowners and businesses an opportunity to own and generate renewable energy. TVA will purchases 100 percent of the output from a qualifying system at a premium of 12 cent / kWh on top of the retail electricity rate for solar and 3 cents / kWh on top of the retail electricity rate for wind, low-impact hydro, and biomass. For solar PV, the amount of the payment is approximately 21 cents /kWh (12 cents + the 9 cents / kWh retail rate). The payment is made regardless of whether the power is consumed onsite or delivered to the transmission system and is guaranteed for a term of up to 10 years. Like the OUC FIT program, TVA retains all rights to RECs.

[146] TVA, *TVA Draft Integrated Resource Plan*, at: http://www.tva.gov/irp/pdf/irp_complete.pdf.
[147] TVA, *Energy Policy Act of 2005, PURPA Standards Net Metering, Final,* March 20, 2007.

The premium payment is long term, guaranteed and based on a host of factors that include: current REC markets, cost to build renewable resources, comparison to current incentives, and a customer rate of return and payback analysis.[148]

Payment is made in the form of a credit issued by the local power company on the monthly power bill for the home or business where the generation system is located. If a qualifying system produces more electricity than it consumes, payment for the excess generation will be issued either monthly or annually, at the discretion of the power company. All new participants in the GP program also receive a $1,000 incentive to offset the upfront cost of the qualifying system.

The installed capacity goal for the entire program is 200 MW. TVA applies the incentive payments to a $50 million cap that is applied to both the purchase of power and the incentive. So, the incentive portion of the program is substantially less than $50 million.

The TVA GP program started in 2003. It was restructured in 2009 with a new pricing structure and extended beyond the 50 kW size, to 999 kW sized systems. On April 1st, the rules changed to allow for consideration of applications for projects not yet constructed. TVA received 75 applications in 8 weeks – an unexpected surge in demand. Project applications that would have required $100 million in incentives were competing for the approximately $20 million in renewable power incentives that were allocated to the program.[149]

TVA, recognizing that the sum of these applications would surpass its budgeted amount for the pilot program, ceased taking applications on June 16, 2010. It resumed the program on June 23rd when TVA announced it would again accept all solar, wind and biomass installations, but only up to 200 kW. Larger projects were allowed to participate in the GP program if the application process was complete as of August 31, 2010. There were 260 approved projects of less than 200kW at the time the program was suspended. Approved projects include mostly solar PV, some wind, some micro hydro, and one biomass project application approved.[150]

To accommodate larger systems, TVA announced in early October 2010 that it was initiating a new standard offer contract program for systems from 201 kW to 20 MW. TVA's Renewable Standard Offer initially will be limited to a total of 100 megawatts from all participants, with no single renewable technology representing more than 50 megawatts of the total.[151] The program will offer different rates based on the time of day, with an average payment of about 5.61 cents / kWh.[152]

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[148] TVA, *TVA Generation Partners FAQ*, at: http://www.tva.com/greenpowerswitch/partners/faq.htm#9.
[149] Conversation with Susan Curtis, TVA Senior Project Manager for Generation Partners, July2010.
[150] *Id.*
[151] TVA News Release, *TVA Launches New Renewable Power Initiative, Continues Generation Partners Growth*, October 8, 2010.
[152] TVA, *Renewable Standard Offer*, at: http://www.tva.com/renewablestandardoffer (last visited February 20, 2011).

The GP program is still operational and has not yet hit its program cost cap. The TVA Board will be considering modifications to the GP FIT program to ensure its longevity and certainty to small scale developers.[153]

TVA Renewable Standard Offer: To accommodate larger systems, TVA announced in early October 2010 that it was initiating a new standard offer contract program for systems from 201 kW to 20 MW. TVA's RSO initially will be limited to a total of 100 megawatts from all participants, with no single renewable technology representing more than 50 megawatts of the total.[154] The program will offer different rates based on the time of day, with an average payment of about 5.61 cents / kWh.[155] To date, TVA's standard offer program has received little interest, primarily due to a low price per kWh and restrictive contract terms that add costs to a project.

Non-production-based incentives

Tax incentives: Tennessee House Bill 809, enacted into law in 2003 states that wind energy systems operated by public utilities, businesses or industrial facilities shall not be taxed at more than one-third of their total installed cost. This law applies to the initial appraisal and subsequent appraisals of wind energy systems.[156]

Grants: The Tennessee Solar Institute offers a renewable energy grant program formally administered by the State of Tennessee Department of Economic and Community Development, Energy Division. To qualify for the grant, the facility where the system will be installed must undergo an energy audit. The grant amounts are 40% of the installed cost for solar PV systems, wind, solar water heating, hydrogen fuel cells and solar hybrid lighting up to a maximum of $75,000. The minimum grant amount is $5,000. The program is limited to business entities.

The Institute recently announced $4.5 million in solar installation grants awarded. Sixty five grants make up the first round of award recipients, which is expected to produce 2.8 MW of new solar development in Tennessee. A total of $9 million is allocated to the Solar Installation Grant program, all of which is expected to be awarded by the end of 2011. [157]

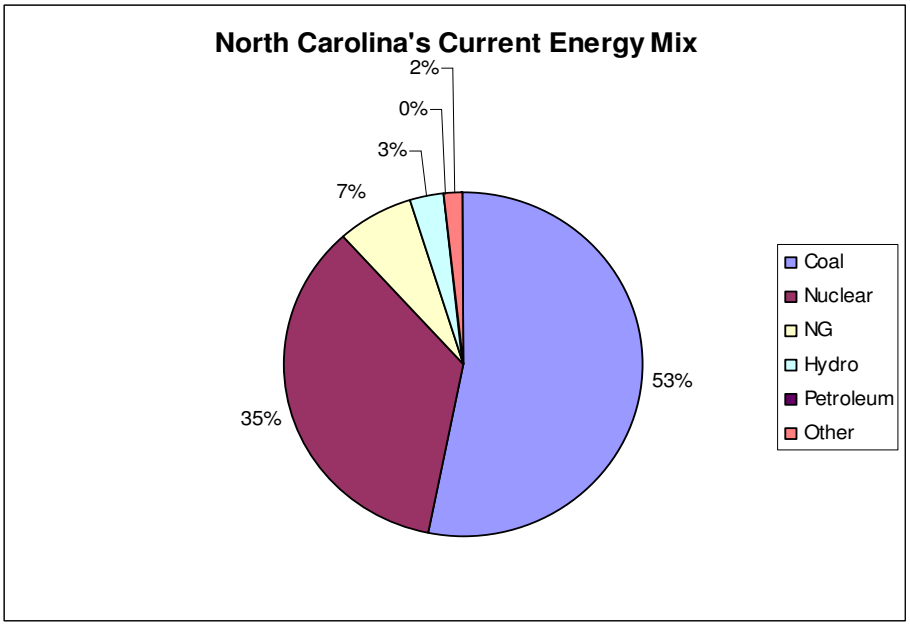
[153] Conversation with Susan Curtis, TVA Senior Project Manager for Generation Partners, October 2010.
[154] TVA News Release, *TVA Launches New Renewable Power Initiative, Continues Generation Partners Growth*, October 8, 2010.
[155] TVA, *Renewable Standard Offer*, at: http://www.tva.com/renewablestandardoffer (last visited February 20, 2011).
[156] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=TN03F&re=1&ee=1.
[157] Tennessee Solar Institute, *TSI Announces 4.5 Million in Solar installation grants, enabling 2.8 MW of new solar conversion in Tennessee* (last visited August 13, 2010).

III. North Carolina

Energy Profile

In North Carolina, coal-fired power plants account for over 50% state's electricity generation, and nuclear power accounts for about one-third. Hydroelectric facilities and natural gas-fired power plants produce the remaining generation.

The state's IOUs are vertically integrated and regulated by the North Carolina utilities Commission (NCUC). The state's IOUs include Duke Energy Carolinas (Duke), Progress Energy Carolinas (PEC) and Dominion Power. North Carolina's 26 electric cooperatives serve more than 2.5 million people in the state.[158] There are over 70 municipally-owned electric utilities in North Carolina.[159]



Source: US Energy Information Administration

Non-hydro renewable energy resources accounted for 1.3 percent of capacity in 2008.[160] North Carolina is state that relies heavily on both coal and nuclear power plants. Duke recently announced that it plans to retire 890 MW more coal-fired capacity by 2015 than it expected, because of tougher US air rules.

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[158] North Carolina's Electric Cooperatives, *About Us*, at: http://www.ncelectriccooperatives.com/about/default.htm (last visited November 1, 2010).
[159] North Carolina Utilities Commission, *2008 Report on Major Activities Through 2008*, 2008-Volume XXXIX.
[160] Energy Information Administration, *North Carolina Renewable Electricity Profile*, at: http://www.eia.doe.gov/cneaf/solar.renewables/page/state_profiles/north_carolina.html.

Programs in North Carolina

North Carolina offers QF-PPAs, although those programs are now minimally attractive given the implementation of the REPS that pays developers for power plus the value of renewable attributes through RECs. The state's utilities offer net metering; and IOU standard offers with production based incentives to assist with REPS compliance. The state also has a generous renewable energy investment tax credit.

Production-based incentives

Renewable and Efficiency Portfolio Standard: North Carolina stands out from Florida and Tennessee because it is the only state in the Southeast with an RPS. The so-called North Carolina Renewable and Efficiency Portfolio Standard (REPS) was enacted by the N.C. General Assembly in 2007. The purpose of the REPS program is to:

a. Diversify the resources used to reliably meet the energy needs of consumers in the State.
b. Provide greater energy security through the use of indigenous energy resources available within the State.
c. Encourage private investment in renewable energy and energy efficiency.
d. Provide improved air quality and other benefits to energy consumers and citizens of the State.

N.C. Gen. Stat. § 62-2(a)(10).

The statute identifies the following REPS targets and eligible renewable resources.[161]

> Renewable energy resource means a solar electric, solar thermal, wind, hydropower, geothermal, or ocean current or wave energy resource; a biomass resource, including agricultural waste, animal waste, wood waste, spent pulping liquors, combustible residues, combustible liquids, combustible gases, energy crops, or landfill methane; waste heat derived from a renewable energy resource and used to produce electricity or useful, measurable thermal energy at a retail electric customer's facility; or hydrogen derived from a renewable energy resource. 'Renewable energy resource' does not include peat, a fossil fuel, or nuclear energy resource.
>
> N.C. Gen. Stat. § 62-2(a)(8)

The REPS requirements for IOUs, for the electric cooperatives and municipal utilities are found below. Energy savings procured through energy efficiency implementation can be utilized to meet up to 25 percent of the compliance targets.

[161] N.C. Gen. Stat. § 62-133.7(b), 62-1337(a)(8).

Requirement for Investor-Owned Utilities

In calendar years:	REPS requirement:
2012, 2013, 2014	3% of prior year's actual retail sales
2015, 2016, 2017	6% of prior year's actual retail sales
2018, 2019, 2020	10% of prior year's actual retail sales
2021 and thereafter	12.5% of prior year's retail sales

Requirement for Electric Cooperatives and Municipal Utilities

In calendar years:	REPS requirement:
2012, 2013, 2014	3% of prior year's actual retail sales
2015, 2016, 2017	6% of prior's year's actual retail sales
2018 and after	10% of prior year's actual sales

The statute provides for several carve-outs. The carve-out for solar resources requires a certain percentage of the prior year's retail sales be met. .

Set-aside for Solar

In calendar years:	carve-out requirement:
2010, 2011	0.02% of prior year's actual retail sales
2012, 2013, 2014	0.07% of prior year's actual retail sales
2015, 2016, 2017	0.14% of prior year's actual retail sales
2018 and thereafter	0.20 % of prior year's actual retail sales

A third-party administrator is tracking the RECs in North Carolina, and it is not clear, at this point, if the utilities are on pace to meet their REPS obligations.[162] That said, Duke is already ahead of schedule in meeting its solar set-aside requirement. The company is completing a 10 MW program of utility owned solar PV distributed generation and secured another 16 MW of central station solar PV in 2008. That will meet Duke's solar set-aside REPS requirement through 2014.[163]

There is no market exchange for trading RECs in North Carolina, only a REC tracking system. The RECs are therefore likely contracted for directly between generator and the incumbent utility. As of August 2010, 18 biomass and 62 solar PV facilities have registered and been accepted as a renewable energy facility with the NCUC for purposes of tracking RECs.[164]

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[162] *See* North Carolina Renewable Energy Tracking System (NC-RETS), at: http://www.ncrets.org/resources/index.htm#public-reports.
[163] Rebuttal Testimony of Owen A. Smith, Director, Corporate Strategic Initiatives and Regulated Renewables Strategy for Duke Energy, Docket E-7, Sub 856, p. 5.
[164] *See* North Carolina Renewable Energy Tracking System (NC-RETS).

The REPS program costs are capped as follows[165]:

Customer Class per account	2008-2011	2012-2014	2015 and thereafter
Residential	$10.00	$12.00	$34.00
Commercial	$50.00	$150.00	$150.00
Industrial	$500	$1,000.00	$1,000.00

QF program: The North Carolina IOUs offer PPAs to comply with their PURPA-QF obligations. For systems for up to 5 MW, the payment for energy is approximately 4.5 cents / kWh for off-peak hours for systems up to 5 MW.[166] These small systems are not considered as displacing future capacity needs for planning purposes, and are generally the baseline for negotiating PPA with larger-sized QFs.[167]

Net metering: The NCUC requires the state's three IOUs to make net metering available to customers that own and operate systems that generate electricity using solar energy, wind energy, hydropower, ocean or wave energy, biomass resources, combined heat and power (CHP) which uses waste heat derived from eligible renewable resources, or hydrogen derived from eligible renewable resources. The individual system capacity limit is 1 MW.

In general, any customer net excess generation during a billing period is carried forward to the following billing period at the utility's full retail rate, and then surrendered to the utility – with no compensation for the customer – at the beginning of each summer billing season. However, the treatment of generation and net excess generation for customers on time-of-use demand tariffs is more complicated. For these customers, on-peak generation is used to offset on-peak consumption, and off-peak generation is used to offset off-peak consumption.[168]

[165] N.C. Gen. Stat. §62-133.7(h)(4),

166Duke Energy Carolinas, LLC, Schedule PP-N, North Carolina Ninth Revised Leaf, No. 91. , at: http://www.duke-energy.com/pdfs/NCPPN.pdf; See PEC Cogeneration and Small Power Producer CSP-25, at: http://www.progress-energy.com/aboutenergy/rates/NC-CSP.pdf.

167 Conversation with NCUC Public Staff person, Kerry Ellis in August 2010. The rates form the basis for negotiated rates for larger projects.

168 Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC05R&re=1&ee=1.

NC GreenPower: NC GreenPower is an independent, nonprofit organization established to provide a production-based incentive funded by voluntary contributions to the program. The stated goal of NC GreenPower is to supplement the state's existing power supply with more green energy. The program accepts financial contributions from North Carolina citizens and businesses to help offset the cost to produce green energy. The program offers short term, *non-guaranteed* standard offer contract to willing participants contingent on adequate funding.[169]

Participants have the option of setting up a PPA with a local utility that can be either "Sell All" or "Sell Excess. NC GreenPower agreements are for 5 years, with the option to renew on an annual basis after the initial contract. Under a "Sell All" arrangement," the program pays 15 cents / kWh for programs under 10 kW. For wind systems under 10 kW, NC GreenPower pays 9 cents / per kWh.

Dukes Standard Offer program: In order to help comply with its REPS requirement, Duke purchases RECs from qualifying renewable energy facilities. The owner of each new renewable energy facility must register and receive approval of the NCUC as a certified renewable energy facility. General RECs Purchase Agreements must provide a minimum of 50 megawatt hours (MWh) per year (50 RECs) up to 5,000 MWh (5,000 RECs) per year. Solar RECs Purchase Agreements must provide a minimum of 35 MWh (35 RECs) per year up to 250 MWh (250 RECs) per year. Projects that are able to provide more than 250 solar RECs per year are not eligible for the standard offer. Participants may not net meter. The standard offer REC price was 3.1 cents / kWh in 2010.[170] This was a limited offer and expired in June 2010, but was restarted again in October 2010.

PEC SunSense Standard Offer program: PEC began offering incentives to *non-residential* customers in North Carolina and South Carolina for generating electricity from solar PV systems in July 2009. PEC will pay 18 cents /kWh for the electricity and RECs generated by the PV system for a period of 20 years to help it comply with its REPS requirement. Like Duke's standard offer program, participating systems may not net meter. Participants must sell all the electricity and RECs generated by the system, and purchase all the electricity their facilities consume.

To be eligible for this incentive, solar PV systems must be installed in North Carolina or South Carolina on real property owned by a non-residential customer of PEC, and the project must have a nameplate capacity from 10 kW to 250 kW. Annual program participation is limited to 5 MW. PEC was halfway towards reaching its annual goal in September 2010.[171]

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[169] NC GreenPower, *About NC Green Power*, at: http://www.ncgreenpower.org/about/program_overview_2.html.

[170] Duke Energy Carolinas, *Standard Purchase for Renewable Energy Certificates*, at, http://www.duke-energy.com/pdfs/REC-Purchase-Offer-Info.pdf (last visited February 24, 2011).

[171] Progress Energy Carolinas, *SunSense Commercial Solar Program Update*, at, at: http://progress-energy.com/custservice/carbusiness/efficiency/programs/pvcomm/PV%20Update2.pdf (last visited February 24, 2011).

PEC has increased the eligible project size for 2011 to 500 kW, but the company reserves the right to decline applications on criteria that the company does not define. From the investor's standpoint, the arbitrary nature of declining applications lacks certainty and transparency and may explain why PEC was falling short of its 5 MW goal in 2010.

Non-production-based incentives

Renewable Investment Tax Credit: North Carolina offers a tax credit equal to 35 percent of the cost of eligible renewable energy property constructed, purchased or leased by a taxpayer and placed into service in North Carolina during the taxable year. The credit has been amended several times since its original inception. The credit is subject to various ceilings depending on sector and the type of renewable-energy system. The following credit limits for various technologies and sectors apply:

- A maximum of $3,500 per dwelling unit for active space heating, combined active space and domestic water-heating systems, and passive space heating used for a non-business purpose;
- A maximum of $1,400 per installation for solar water-heating systems, including solar pool-heating systems used for a non-business purpose;
- A maximum of $8,400 for geothermal heat pumps and geothermal equipment that uses geothermal energy for water heating or active space heating or cooling used for a non-business purpose;
- A maximum of $10,500 per installation for photovoltaic systems (also known as PV systems or solar-electric systems), wind-energy systems, combined heat and power systems, or certain other renewable-energy systems used for a *non*-business purpose; and
- A maximum of $2.5 million per installation for all solar, wind, hydro, geothermal and biomass applications used for a business purpose, including PV, daylighting, solar water-heating and space-heating technologies.

The allowable credit may not exceed 50% of a taxpayer's state tax liability for the year, reduced by the sum of all other state tax credits. Qualifying renewable-energy systems used for a non-business purpose must take the maximum credit amount allowable for the tax year in which the system is installed. If the credit is not used entirely during the first year, the remaining amount may be carried over for the next five years.[172]

Property tax abatement: In August 2008, North Carolina enacted legislation that exempts 80% of the appraised value of solar from property tax. This incentive is effective for taxable years beginning on or after July 1, 2008.[173]

Rebates: In addition to tax incentives, several utilities, including PEC, South River and Piedmont Electric Cooperatives offer rebates on solar water heaters.[174]

[172] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC19F&re=1&ee=1.
[173] *Id*. at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC51F&re=1&ee=1.
[174] *Id*. at: http://www.dsireusa.org/incentives.

Grants: The North Carolina Green Business Fund, created in 2007, provides funding to North Carolina small and mid-size businesses, nonprofit organizations, state agencies and local governments to encourage the development and commercialization of "promising" renewable energy and green building technologies. Grants of up to $500,000 are available for the development of commercial innovations and applications in the biofuels industry, sustainable building practices and private sector investment in renewable energy technologies. North Carolina-based businesses and nonprofits with fewer than 100 employees, as well as state and local governmental entities, are generally eligible.

The 2009-2010 funding round had a total of $8,300,000. The fund was greatly expanded by SB 202 of 2009 using money allocated to the state by the federal American Recovery and Reinvestment Act of 2009.[175] In 2009 18 small businesses received grants up to $100,000 to develop and market promising green and alternative energy technologies and products.[176] Of the 18 grants awarded, 4 grants appear to have gone to either established biomass or solar related technology companies.[177]

[175] *Id.* at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC47F&re=1&ee=0.
[176] North Carolina Board of Science and Technology, *North Carolina Green Business Fund*, at: http://www.ncscitech.com/gbf/index.htm.
[177] *Id*. at: http://www.ncscitech.com/PDF/gbf/ncgbf_2009_round_2_awardees.pdf.

Florida, North Carolina and Tennessee Renewable Policy at a Glance

	Florida	**Tennessee / TVA**	**North Carolina**
Current Renewable (non-hydro) capacity	1.8%	TVA: 1.0%	1.3%
Goals	Broad legislative intent language to promote renewable energy	TVA: 50% 'clean' energy by 2020 intent	3% 2012
State Programs	Tax incentives, grants, net metering	TN: Tax incentives, grants	REPS, net metering, tax incentives, grants
Utility Programs	Net metering, FIT, production-based incentive(PBI), rebates	TVA: GP and RSO programs	Net metering, PBIs, rebates

Summary of Production Based Incentives Programs[178]

Program	**Solar**	**Biomass**	**Wind**
NC Green Power	15 cents /kWh for solar PV when funding available under 10 kW-expedited process >Term not guaranteed	Competitive bid	9 cents/ kWh when funding available under 10 kW
PEC SunSense Standard Offer	18 cents /kWh for PV for solar thermal (commercial – sell all) up to 500 kW-roof mounted only – 5 MW program cap >20 year term	N/A	N/A
Duke Energy Standard Offer	Up to 250 kW 3.1 cents/kWh	0.62 cents /kWh	0.62 cents/kWh
OUC Pilot Solar Program FIT	5 cents /kWh PV; 3 cents/kWh Solar Thermal; offsite excess at full retail rate >5 year term w/ successive terms	N/A	N/A
Gainesville (generation cost-based FIT program)	32 cents/kWh in 2010 roof mounted; 26 cents/kWh ground mounted >20 year term	N/A	N/A
TVA Generation Partners FIT	12 cents/kWh premium on top of retail for solar PV >10 year term	3 cents/kWh premium on top of retail	3 cents/kWh premium on top of retail
TVA RSO program	5.61 cents/kWh base >10 – 20 year term	5.61 cents/kWh base	5.61 cents/kWh base

[178] Excludes PURPA-QF and net metering programs.

IV. Challenges and Opportunities in the Southeast

The Southeast lacks comprehensive renewable energy policy certainty and price points that support renewable energy development, with exception of the North Carolina REPS. The PPA-QF programs and net metering programs offer price points that are too low for meaningful renewable energy development. The regions FIT programs, like TVA GP and the GRU FIT are important foundations for scaling up renewable energy development in the Southeast; but on their own, are insufficient in scale to advance meaningful renewable energy development.

Production Based Incentives

A. Avoided Cost in QF Program Too Low for Widespread Development

PURPA-avoided cost prices: The utilities avoided cost can be defined as the cost to the utility of next incremental unit of electricity. In the context of federal law on payment to non-utility providers of renewable energy, it is defined as the "the cost to the electric utility of the electric energy which, but for the purchase from such cogenerator or small power producer, such utility would generate or purchase from another source."[179]

The avoided cost benchmarks vary among Southeast region states but range from 4 cents to 6 cents /kWh. The methods used to implement PURPA vary significantly in structure and method within the region. Ultimately, further research is required to explore the development of the avoided cost benchmark throughout the region and identify state public utility commissions that might be receptive to a more progressive implementation of PURPA with higher avoided cost benchmarks.

It should be noted that a recent decision by FERC will provide more flexibility to states to determine avoided costs, especially states with renewable energy mandates.[180] The ruling could provide more flexibility in North Carolina for the state to set a higher avoided cost price point; it not clear yet what impact the ruling it might have in other states in the region. The table below is offered as a simple snapshot of varying avoided cost benchmarks in the region.

[179] 16 U.S.C. 824a-3(d).

[180] FERC Clarifying Order, 133 FERC ¶ 61,059, October 21, 2010. (In setting the avoided cost, utility commissions may consider "all sources able to sell to the utility," and thus the concept of a multi-tiered avoided cost rate structure can be consistent with the avoided cost rate requirements set forth in PURPA and FERC regulations. For example, if a state required a utility to purchase 10 percent of its energy needs from renewable resources, then a natural gas-fired unit, for example, would not be a source "able to sell" to that utility for the specified renewable resources segment of the utility's energy needs, and thus would not be relevant to determining avoided costs for that segment of the utility's energy needs).

Range of Energy Rate Payments in Southeast

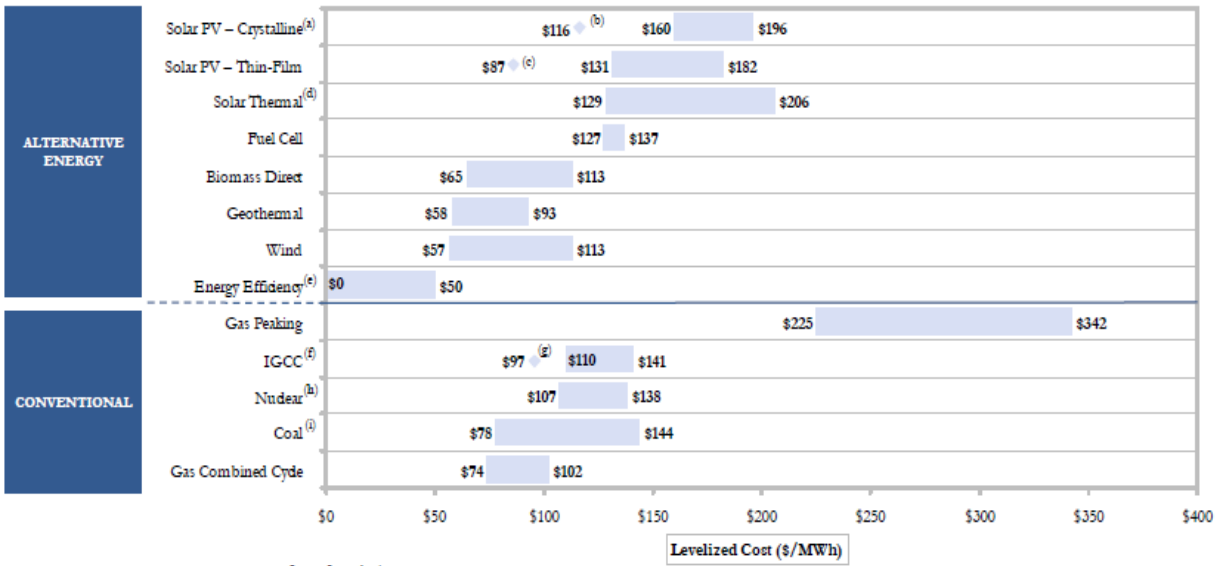
Utility	System Size	Price offered for energy
FPL – FL	<100 kW	5.45 cents / kWh [181]
Duke – NC	< 5MW	4.67 cents / kWh [182]
TVA	No limit indicated	3.51 cents / kWh[183]

No solar energy development that has relied on the QF-PPA programs in the Southeast region. A review of various levelized costs for different renewable energy technologies sheds light on why renewable resources with higher generation costs have not utilized the QF-PPAs based on the utilities avoided cost.

The capital cost of the projects and the operating cost of the projects over its lifetime are referred to as the levelized cost. The levelized cost of a resource represents a constant cost per unit of generation that is commonly used to compare one unit's generation cost with other resources over similar periods. Generally, biomass projects have had similar levelized cost with onshore wind projects; both are price competitive with conventional power plants. Solar PV projects, however, have a substantially higher levelized cost than biomass or wind projects and are therefore at a distinct disadvantage under an avoided cost payment benchmark.

[181] Florida Power and Light, *Tariff: Revised Sheet No. 10.100 FPL, COG-1*: *As Available Rate, Effective May 13, 2010 for October 1, 2010 – March 31, 2011*. (The Company will purchase, at its option, energy offered by any Qualifying Facility located within the State of Florida As-Available Energy is described by Florida Public Service Commission Rule 25-17.0825, F.A.C. and is energy produced and sold by a Qualifying Facility on an hour-by-hour basis for which contractual commitments as to the time, quantity, or reliability of delivery are not required).
[182] Duke Energy Carolinas, LLC, *Schedule PP-N, North Carolina Ninth Revised Leaf, No. 91*. (Available only to establishments located in the Company's North Carolina service territory which have non-hydroelectric qualifying facilities fueled by trash or methane derived from landfills, hog waste, poultry waste, solar, wind, and non-animal forms of biomass contracting to sell generating capacity and energy not in excess of five MW and interconnected to transmission system).
[183] TVA, *Dispersed Power Production Guidelines*, July 1, 2010, at: http://www.tva.gov/abouttva/pdf/dispersed.pdf.

Levelized Cost Comparison



Source: Lazard, Levelized Cost of Energy Analysis, 2009

The avoided cost pricing methodology allows retail utilities to procure power and price points that are competitive with current conventional generation. Only biomass, wind and geothermal resources come close to a levelized cost that approaches the 5.6 cents / kWh offered recently by a Florida utility to biomass developer though a PPA.[184] That framework frustrates traditional FIT advocates and is succinctly summarized below. [185]

> The least effective method is to base the tariff on the cost of a conventional fossil-fueled power plant that would be "avoided" by installing renewable energy. Unlike successful programs where the tariffs are determined by the specific characteristics of each renewable energy technology, avoided cost tariffs are determined by the characteristics of a conventional technology. Tariffs based on [PURPA] avoided cost are not renewable energy policy; they are fossil-fuel policy with a provision for "allowing" renewable energy to participate.

[184] A recent PPA between Hillsborough County and Seminole Electric Cooperative paid a rate of $0.056 per kWh. for third party power generated at the Hillsborough County Resource Recovery Facility.
[185] Paul Gipe, *Grading North American FITs*, World Futures Council May 2010.

Project Types Developed under QF Model in FPL's Territory

FPL Firm Capacity and Energy Purchases in 2009 (MW)[186]

Name	Fuel	Summer MW
Broward North	Municipal solid waste	457
Broward South	Municipal solid waste	4
Palm Beach SWA	Municipal solid waste	50

FPL Renewable Energy - Energy Only Purchases in 2009 (MWh)[187]

Name	Fuel	MWh
Okeelanta	Sugar cane waste	265,929
Broward South	Municipal solid waste	130,430
Tomoka Farms	Landfill gas	16,436
Georgia Pacific	Paper byproduct	2,855
Rothenbach Park[188]	Solar PV (250 kW)	317

FPL's PURPA-QF program has not been successful in encouraging the development of more QF-based power additions. The lack of significant development is emblematic with the lack of PPA generated development in North Carolina and Tennessee. The company concedes the unsuccessful results of its PPA program below.

> FPL is seeking cost-effective Power Purchase Agreements (PPAs) with any and all potential renewable energy providers. FPL issued a Renewable Request for Proposals (RFP) in 2007 that solicited proposals that offered capacity and/or energy from new renewable energy facilities. None of the responsive bids in this RFP were at or below FPL's projected avoided cost. FPL issued another Renewable Energy RFP in April 2008, which resulted in six bids received by July. Analysis of the bids was delayed by the extreme volatility in the commodity fuel and capital markets in late 2008. Current analysis indicates that none of the bids may have the potential to provide firm capacity and/or energy at avoided cost prices.[189]

Often developers complaints go beyond the price paid – to other contract provisions. Biomass developers in Florida cite several concerns beyond the payment levels. The complaints include: performance requirements that require 97% capacity; the utility's ability to dictate the generator's maintenance schedule; and excessive time frames for the utility to exercise first right of refusal over the purchase of RECs.[190]

The North Carolina PURPA-QF program has yielded no solar projects and several energy from waste projects, biogas and timber residue facilities. The facilities include a total of

[186] FPL, 2010 *Ten Year Power Plant Site Plan*, p. 22, April 2010.
[187] *Id.*
[188] Construction of the solar facility was funded through FPL's now-defunct green pricing program.
[189] FPL, *Ten Year Power Plant Site Plan*, p. 87, April 2009.
[190] Wheelabrator Technology Inc. Protest of Order No. Florida PSC-080544, September 9, 2008.

approximately 11 MW of biogas projects, about 22 MW of energy from municipal solid waste, and approximately 460 MW of power generated from timber residue.[191]

Likewise, the TVA and distribution company PURPA-QF program has yielded few MW of renewable projects in Tennessee. The projects include a total of 8 MW of biogas, and 145 MW of power generated from timber residue.[192]

B. Net Metering: Price Insufficient or not Available

Florida: The only major Florida utility that offers detailed public information on net-metered customers is FPL. As of April 2010, it had 645 customers interconnected through its net metering program. Given FPL's 4.5 million customer base, 645 customers is a relatively small amount. Net metering is the only incentive available to customers of Florida's IOUs. The Florida net metering rule provides that any excess generation will be credited back to the customers at the utilities avoided cost.[193] While customers can offset their own use at the retail rate, the excess payment at avoided cost does not appear to have encouraged widespread development of distributed renewable resources in Florida.

North Carolina: Net metering participation in North Carolina is "very low," simply because standard offer programs offer higher levels of compensation to renewable energy providers.[194] There is currently no information available on level on net metering in North Carolina. The NCUC requires the state's three investor-owned utilities to make net metering available to customers. In general, the customer's net excess generation during a billing period is carried forward to the following billing period at the utility's full retail rate, and then surrendered to the utility – with no compensation for the customer – at the beginning of each summer billing season. While customers can offset their own use at the retail rate, the lack of further incentive appears to not to have encouraged widespread development of distributed renewable resources in North Carolina. Most net metered customers can receive higher compensation through Duke's and PEC's standard offer programs for RECs that help those utilities meet their REPS compliance.

Tennessee: Because of TVA's current power contracts with its local power companies, net-metering is not an option in the TVA service territory.[195] TVA created its GP program as a "dual-metering" option and alternative to net-metering.

C. RECs – Poised to Make North Carolina a Leader in the Region

[191] SACE database for Southeast region.
[192] *Id.*
[193] Florida Rule 25-6.065, F.A.C. (2008).
[194] Conversation with NCUC staff person Kerry Ellis, August 2010.
[195] TVA distribution utilities have "all-requirements" contracts with TVA whereby they agree to buy power from TVA to meet their power needs. These utilities would find it difficult to offer their own distinct net metering programs as it would likely breach the TVA all-requirements contract provision.

North Carolina stands out in the Southeast as it is the only state with a RPS. The NC REPS is one of 29 state RPS programs that set targets and timelines for renewable energy generation or procurement by state utilities.

The REPS policy is significant because North Carolina will likely be a leader in renewable energy development in the Southeast when it reaches it first REPS target in 2012. A third-party administrator is tracking the RECs in North Carolina, and it is not clear, at this point, if the utilities are on pace to meet their REPS obligations.[196] That said, Duke is already ahead of schedule in meeting its solar set-aside requirement. The company is completing a 10 MW program of utility owned solar PV distributed generation and secured another 16 MW of central station solar PV in 2008. That will meet Duke's solar set-aside REPS requirement through 2014.[197]

One criticism of the RPS model is that it requires time and resources to develop a project and bid or negotiate contracts for sale of power and RECs. Consequently, the required return on investment for competitive bidding or negotiations is much higher than in jurisdictions with a FIT program.[198] While these transaction costs may represent only a small percentage of the project, they increase the return on investment requirement, which in turn increased the required payment price for renewable electricity. The overall market structure that results from a competitive bidding framework tend to make it more difficult for small developers to participate and limit the investor pool.

D. Other Production-based Incentive Programs – an Incremental Improvement

NC Green Power: NC GreenPower is an independent, nonprofit organization established to provide production based incentives funded by voluntary contributions to the program. The program offers short term, *non-guaranteed* standard offer contract to willing participants contingent on adequate funding. The program has 357 participating renewable energy generators comprised of wind, landfill gas, and small solar PV systems.[199] The 15 cent / kWh payment for PV solar brings it almost to the payment of the TVA GP program. Yet the non-guaranteed nature of the contracts has not encouraged significantly-sized solar development. Most solar PV projects participating in the program are average of approximately 5 kW in size.

Duke and PEC offer production-based incentive programs for smaller sized projects that are intended to help them meet them procure RECs to meet their REPS compliance targets. Those programs are discussed in the context of RECs below.

Duke Standard Offer program: In order to help comply with the REPS requirements Duke was purchasing renewable energy credits (REC) from qualifying renewable energy

[196] North Carolina Renewable Energy Tracking System (NC-RETS), at: http://www.ncrets.org/resources/index.htm#public-reports.
[197] Rebuttal Testimony of Owen A. Smith, Director, Corporate Strategic Initiatives and Regulated Renewables Strategy for Duke Energy, Docket E-7, Sub 856, p. 5.
[198] *See* Cory, et al., *Feed in Tariff Policy: Design, Implementation, and RPS Policy Interactions*, p. 9, March 2009.
[199] NC Greenpower, *Resources,* at: http://www.ncgreenpower.org/resources/generators.php.

facilities. Projects that are able to provide more than 250 solar RECs per year are not eligible for the standard offer. Participants may not net meter. The standard offer solar REC price was 3.1 cents / kWh and .6 cents / kWh for general RECs in 2010.[200] This was a limited offer and expired in June 2010 and restarted in October 2010. The program had approximately 20 participants and none of them were solar energy producers.[201] The program has a cap but Duke will not reveal it. The lack of transparency and certainty in this program does not inspire investor confidence.

PEC SunSense Standard Offer program: PEC began offering incentives to *non-residential* customers in North Carolina and South Carolina for generating electricity from solar PV systems in July 2009. PEC pays 18 cents / kWh for the electricity and RECs generated by the PV system for a period of 20 years to help it comply with its REPS requirement. According to PEC staff, the program is on track to reach its 5 MW capacity goal for 2010.[202]

The program offers long term contracts – for a 20 year term. The payment is fixed and guaranteed. The challenge with the program is that it is capped at projects of 250 kW or less. That cap has been increased to 500 kW for 2011. Anecdotal evidence suggests that developers are not interested in developing projects of that size, preferring instead larger projects. That is because their financing partners are looking for larger projects that can provide a greater total return on investment.

OUC Pilot Solar Program: The OUC FIT program has well over 300 customers with another 75 in the queue (still in the application process). The 77 OUC solar PV customers who have availed themselves of the incentive is a significantly higher percentage of participation than the FPL customers who participate in the company's net metering program. FPL's net metering program has 650 customers over its 4.5 million customer bases, whereas, the OUC FIT program has 62 solar PV customers, with more in queue, over its 204,650 customer base.[203]. Clearly, the OUC FIT, in this case, is relatively deploying more solar PV than the state's largest utility's net metering program.

OUC Pilot Solar Program Participation Levels[204]

Number of solar thermal customers	270
Number of PV customers	77
Capacity of thermal solar	702.70 kW
Capacity of PV solar	1,554.57MW
Number of customers in application process	75

[200] Duke Energy Carolinas, *Standard Purchase for Renewable Energy Certificates*, at, http://www.duke-energy.com/pdfs/REC-Purchase-Offer-Info.pdf (last visited October 24, 2010).
[201] Conversation with Duke Staff person, Steve W. Smith, September 2010.
[202] Conversation with PEC Staff Person, Linda Kushner, September 2010.
[203] Orlando Utilities Commission, Ten Year Site Plan, April 2010.
[204] Communication with OUC Renewables Coordinator, Pauline Furfaro, February 6, 2011.

E. FIT Programs – Can be Significant if Scaled-up

The three existing FIT programs in the region provide a foundation from which to scale up existing programs and create similar programs throughout the region. The existing programs have deployed collectively approximately 47 MW of solar PV and 16 MW of biomass development.[205]

TVA Generation Partners: TVA has 37 projects awaiting approval and another 25 in various stages of development. Of those projects, 29 of them represent one or more MW of capacity. TVA has approved a total of almost 500 projects totaling about 60 MW.[206] The approved projects are below.

Generation Partners Approved Projects

Technology	No. of projects	MW capacity
Solar	461	43
Biomass	18	16
Wind	16	70 kW
Micro hydro	1	110 kW

TVA Renewable Standard Offer: To accommodate larger systems, TVA announced in early October 2010 that it was initiating a new standard offer contract program for systems from 201 kW to 20 MW. TVA's RSO initially will be limited to a total of 100 megawatts from all participants, with no single renewable technology representing more than 50 megawatts of the total.[207] The program will offer different rates based on the time of day, with an average payment of about 5.61 cents / kWh.[208] To date, TVA's standard offer program has received little interest, primarily due to a low price per kWh and restrictive contract terms that add costs to a project.

GRU generation cost-based FIT program: Modeled on Germany's FIT, the GRU FIT purchases energy from qualified solar PV systems via standard offer contracts for a period of 20 years at a payment of up to 32 cents / kWh. The payments are guaranteed, fixed payments with tariffs differentiated by size and by roof mounted or ground mounted systems and aims to deploy 32 MW of solar PV by 2017. The payments are intended to compensate the cost to generate electricity plus a return on investment of 5 percent.[209]

The program is open to both residential and commercial customers but is capped to systems no greater than 250 kW. Its annual program cap is 4 MW – the program was

[205] This does not include any project development from the recently announced TVA RSO program.
[206] Communication with Susan Curtis, TVA Senior Project Manager for Generation Partners, October 2010.
[207] TVA News Release, *TVA Launches New Renewable Power Initiative, Continues Generation Partners Growth*, October 8, 2010.
[208] TVA, *Renewable Standard Offer*, at: http://www.tva.com/renewablestandardoffer (last visited February 20, 2011).
[209] GRU, *Solar Feed-in Tariff Workshop*, June 9, 2010, at: http://www.gru.com/Pdf/SolarFIT/SolarFITContractorWorkshop6-9-10.pdf.

fully subscribed after 3 weeks. The program is similarly fully subscribed for 2011. Slightly more than 3 MW of solar PV have been deployed..[210]

F. Tax incentives, Rebates, Grants – Can't Drive Development Alone

Federal tax incentives: Tax credits are probably the most common US non-production-based alternative to promote the commercialization and deployment of renewable energy technologies. The most available form of tax credit across the region is the federal investment tax credit (ITC). The ITC is available for personal and business (including utilities) entities choosing to install solar PV systems. The credit also extends to fuel cells, small wind turbines, geothermal systems, micro turbines and CHP. For solar power, the credit is equal to 30% of expenditures, with no maximum credit. Eligible solar energy property includes equipment that uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat. Hybrid solar lighting systems, which use solar energy to illuminate the inside of a structure using fiber-optic distributed sunlight, are eligible. Passive solar systems and solar pool-heating systems are *not* eligible. The credit has been further expanded to allow business entities the option take the ITC or to take an up-front grant from the United States Department of Treasury for up to 30 percent of the basis of the solar energy property.[211]

If the ITC is taken as an upfront grant, it functions similarly to rebate programs; however, there are a few critical differences. First, tax credits may not be collected until an individual or business files their tax returns in the year following the purchase. In addition, a tax credit requires a tax liability for the consumer to capitalize on the value of the incentive.

The federal renewable electricity production tax credit (PTC) is a per-kilowatt-hour tax credit for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year. The eligible resources include landfill gas, wind, biomass, hydrokinetic, small hydroelectric and wave and tidal energy.[212]

State tax incentives

- Florida: Solar energy systems have been exempt from Florida's sales and use tax since July 1, 1997. The term "solar energy system" means the equipment and requisite hardware that provide and are used for collecting, transferring, converting, storing or using incidental solar energy for water heating, space heating and cooling, or other applications that would otherwise require the use of a conventional source of energy such as petroleum products, natural gas, manufactured gas or electricity. Vendors of solar energy systems or components are required to document exempt sales.[213]

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[210] *Id.*
[211] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F.
[212] *Id.*, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F. Production tax credits are beyond the scope of this report.
[213] *Id.*, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=FL01F&re=1&ee=1.

- Tennessee: the state offers tax incentives limited to wind energy system. It limits real estate tax assessment to no more than one-third of the installed cost of the system.

- North Carolina: the state offers the most generous state tax incentive of the three states at 35 percent. A 35 percent state tax credit coupled with the 30 percent federal ITC can drive down the upfront cost of new systems by 65 percent.

Tax incentives can be significantly lower project costs. The federal ITC can lower project capital costs by 30 percent. In North Carolina, developers and utilities can couple the ITC with the state's 35% ITC, reducing project costs by 65 percent. That said, in the two highlighted cases below, the utilities had to get approval from their respective public utility commissions because their projects cost would be above the avoided cost benchmark. Therefore, the tax incentives alone were not able to make the projects competitive with conventional generation.

- Duke 10 MW distributed solar PV project has taken advantage of the state tax incentive and the federal ITC to substantially lower the project cost of its program.[214] Yet, the company would have never proceeded with the project if not for the REPS program that allows for cost recovery above the company's avoided cost.[215]

- FPL has taken advantage of the federal ITC to bring down the cost of its 25 MW solar PV plant in De Soto, Florida.[216] Yet, the company would have never proceeded with the project if the legislature had not amended state statute in 2008 to provide for guaranteed cost recovery for 110 MW of renewable energy projects.[217] The cost recovery change was critical because the projects levelized cost was considerably higher than the utility's avoided cost.[218]

Rebates: Rebates for solar PV are primarily used to encourage the installation of new capacity and are delivered to the system's owner after installation to offset up-front costs already incurred. These programs vary widely nationally, depending upon the size and type of installation and the program administrator.

California has the most aggressive statewide incentive rebate program in terms of the number of different types of incentives, the $2.2 billion total funding available, and statewide

[214] Testimony of Owen A. Smith, Director, Corporate strategic Initiatives and Regulated Renewables Strategy for Duke Energy, Docket E-7, Sub 856, p. 15, July 25, 2008.
[215] *See* Testimony of Jane L. McManeus, Director, Rates for Duke Energy Carolinas, Docket E-7, Sub 856, July 25, 2008. (The company testified that it would recover its incremental cost of the project, above avoided cost, through an annual rider as permitted by NCUC rules).
[216] The Recovery Act Promoting Clean, Renewable Energy: Investment in Wind and Solar, at: http://www.whitehouse.gov/recovery/innovations/clean-renewable-energy#20.
[217] §366.92(4), Fla. Stat.
[218] The company has never disclosed the levelized cost of its De Soto project, its only burden to the FPSC was to prove that capital costs were reasonable and prudent. Anecdotal evidence suggests that it was approximately 24 cents / kWh.

capacity goals. The California Solar Initiative (CSI) aims to install 1,940 MW of new PV within the state by the end of 2016.[219]

NREL analyzed 5 rebate programs through the U.S. and found that renewable energy rebates often target residential and commercial consumers and comparable distributed-scale energy technologies. In this specific market, rebates are a primary driver of distributed power generation and deployment of renewable energy technologies. For example, solar power rebate programs in California have supported installation growth from approximately one system per month to the point where 111 MW of grid-tied solar power was added in the first nine months of 2008 alone.[220]

However, because rebate programs are often applied to smaller scale emerging technologies with limited or zero market share, the short-term market impacts of successful rebate programs on some high-level renewable energy policy drivers—including economic development, environmental benefits, and energy security—may be limited when compared to the scale of electricity and energy markets at the state or national level.[221]

The report concluded that the small market share that rebate programs have established for distributed renewable energy technologies also suggests that rebate programs *alone* are not likely to single-handedly drive the emergence of a new clean energy economic sector.[222]

No state-wide rebates in the 3 highlighted states: Florida no longer has a state-wide solar rebate program, since the Renewable Energy Technologies Grants Program has not been re-funded for 2009-10 by the state legislature. The state's IOUs have proposed demand-side management renewable programs of approximately $25 million annually pursuant to order by the FPSC. There is some hope among solar activists that the utility programs can absorb a portion of the unmet need for rebates after the sunset of the Florida solar rebate program in 2010. There are host of municipal utility and electric cooperative-sponsored rebate programs; those programs are primarily focused on incenting solar hot water development.

There are also no significant renewable energy rebates in Tennessee or North Carolina. North Carolina has a smattering of utility-sponsored rebates focused exclusively on incenting the development of solar hot water systems. No rebate programs could be identified in Tennessee.

It is important to note, that even the states were to adopt meaningful rebate programs, those programs alone are not likely to single-handedly create a vibrant state market for renewable energy development.

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[219] California Public Utilities Commission, *California Solar Initiative 2010 Annual Program Assessment*, July 9, 2010(California is already 42 percent of the way towards its general market program goal in the territories of the investor-owned utilities).
[220] *See* Lantz and Doris, State Clean Energy Practices: Renewable Energy Rebates, NREL, March 2009.
[221] *Id*. at 13.
[222] *Id.* at 16.

Grants: Similar to rebates, cash grants are intended to assist in paying down the up-front costs of installing a solar electric system. However, a grant is generally distributed to a system owner prior to the installation of the system and can even be used to encourage R&D or support commercialization. Applications for solar electric grant programs can be competitive, with administrators assessing the viability of a project based on the overall size of the installation, energy needs of the applicant, and expected lifetime performance of the system.[223]

Similar to rebates, cash grants are intended to assist in paying down the up-front costs of installing a solar electric system. However, grants are often provided to fledgling companies to promote research and development or support commercialization. A review of the grant award recipients bears out this conclusion.

There is no dedicated source of grant funding in Florida. The Renewable Energy Technologies Grants Program was originally established in 2006 had no funds remaining in the program in 2010. Florida has taken advantage of significant ARRA State Energy Plan funding to funnel money to several program areas that include promoting small scale renewable energy development and energy efficiency implementation. The ARRA funding is non-recurring. Without legislative appropriation, the Renewable Energy Technologies Grants Program will not have funding to continue. At this time, the state of Florida has no viable state grant program and is relying on ARRA funding to promote a host of clean energy initiatives.

North Carolina and Tennessee have ongoing grant programs. The North Carolina Green Business Fund, created in 2007, provides funding to North Carolina small and mid-size businesses, nonprofit organizations, state agencies and local governments to encourage the development and commercialization of "promising" renewable energy and green building technologies. Of the 18 grants awarded in 2010, 4 grants appear to have gone to either established biomass or solar related technology companies.[224] The others were distributed to presumably fledgling companies to help bring their product or technology to commercialization.

The Tennessee Solar Institute offers a renewable energy grant program formally administered by the State of Tennessee Economic and Community Development Energy Division. The Institute recently announced $4.5 million in solar installation grants awarded. Sixty five grants make up the first round of award recipients, which is expected to produce 2.8 MW of new solar development in Tennessee. A total of $9 million is allocated to the Solar Installation Grant program. [225] This was the only grant program identified in Tennessee. While the first round of grant awards is expected to create almost

[223] Burgie and Crandall, *The Application of Feed-in Tariffs and other Incentives to Promote Renewable Energy in Colorado*, p. 23, September 29, 2009.
[224] North Carolina Green Business Fund 2009 Award Winners, at: http://www.ncscitech.com/PDF/gbf/ncgbf_2009_round_2_awardees.pdf.
[225] Tennessee Solar Institute, *TSI Announces 4.5 Million in Solar installation grants, enabling 2.8 MW of new solar conversion in Tennessee,* August 13, 2010.

3 MW of solar, the program has only 50 percent of its funding available and it is not clear it can provide significant recurring grants in the future.

While grant programs, if sufficiently funded could help fledging companies bring their product or technology to commercialization. With the exception of the relatively small grant program in Tennessee, the now-defunct Florida program and the North Carolina program focus their grants on fledgling companies. Grant programs do not appear to be the type of programs that can help reduce project costs for established renewable energy developers. Hence, grant programs cannot be relied upon to rapidly deploy renewable energy in the Southeast.

Appendix C

Florida Politics Around Renewable Energy

Insight into Political Challenges in the Southeast
Recent political activity around RPS development in Florida can provide insight into the political challenges that meaningful renewable energy initiatives might face in other regions of the Southeast. The executive branch was the catalyst to the renewable energy policy movement in Florida in 2007. The legislature has since been the biggest roadblock to passing a renewable energy policy.

Governor Crist signed three executive Orders on July 13, 2007.[226] Executive Order 07-127 called on the Florida Public Service Commission (FPSC) to "not later than September 17, 2007, initiate rulemaking to require that utilities produce at least 20% of their electricity from renewable energy sources with a strong focus on solar and wind energy." The FPSC initiated the workshop process late in 2007. At the time there was some question regarding the agency's ability to engage in RPS rulemaking without legislative authority.

That concern was resolved in the 2008 state legislative session when the legislature provided authority to FPSC to promulgate a RPS rule, but with a provision that would have to "ratify" the rule. The Commission was fully engaged in rule making in 2008 – holding numerous workshops. SACE was active in the workshop process offering testimony and written comments. With little guidance in its legislative directive, the Commission struggled with target and rate impact issues.

Navigant Consulting, Inc. was hired to provide the technical and achievable renewable energy potential in Florida. The potential modeling utilized a host of factors that comprised three modeling scenarios. In its report, issued December 30, 2008, Navigant Consulting concluded that under a mid-favorable scenario for renewable energy development with a 2 percent rate cap, Florida could achieve 12 percent renewable energy production; while under a favorable scenario with a 5 percent rate cap, Florida could achieve 24% renewable energy production by 2020.[227]

The Florida Municipal Electric Association, headed by Barry Moline, advocated for the Commission to set a price cap and let the market determine how much renewable energy it could build. This concept gained some favor early in the process but later faded since it didn't comport with typical RPS design.

RPS Rule in 2009
Ultimately, the FPSC promulgated a rule with a 20 percent goal by 2021. The draft rule included a 2 percent rate cap to control costs and a 25 percent set-aside for "Class 1" renewable resources: wind and solar. Seventy five percent of the rate cap was allocated to

[226] *See* Executive Orders, at: http://www.flgov.com/release/9217.
[227] Navigant Consulting, Inc., Florida *Renewable Energy Potential Assessment*, December 2008.

solar and wind resources and the remainder to other resources, such as biomass. Much of the debate before the Commission focused on the size of the rate cap. Clean energy advocates maintained that a 2 percent rate cap was too low to reach the 20 percent target, while consumer group representatives advocated for a lower rate cap to minimize impact to low and fixed income ratepayers. Having promulgated and delivered a rule to the Legislature in early 2009, attention turned to the 2009 legislative session.

SACE formed the Renewable Energy Alliance (REAL) so that advocates from both the solar and biomass renewable energy spectrums could speak with one voice in support of a RPS policy. The coalition included solar and biomass businesses and clean energy non-profit advocacy groups. The group largely succeeded in forging core principles of agreement on the RPS rule, but disagreement arose on the appropriate rate cap apportionment between solar and biomass. One unexpected development was the significant lobbying presence of FIT advocates.

FIT advocates, led primarily by Jerry Karnas, an Environmental Defense consultant, and John Burges, a Sarasota-based investor, created a group called the Florida Association for Renewable Energy (FARE). The group held multiple workshops on the benefit of FIT programs and submitted a proposed bill to Representative Paige Kreegel, then Chairman of the House Energy and Utilities Policy Committee. The intense lobbying by FIT advocates on the heels of the passage of a RPS rule, created some policy confusion among legislators. Many legislators were being introduced to renewable energy policy for the first time – especially House members.

The Senate, with the leadership of Senator King, Chairman of the Senate Communications, Energy and Public Utilities Committee, passed a modified version of the RPS proposed rule. The Senate bill, SB 1154, contemplated a "Clean Energy Standard" that kept the 20 x 20 target but allowed nuclear sources to account for 25 percent of the target with no impact on the rate cap – essentially creating a 15 percent by 2020 RPS.[228]

Unfortunately, the bill stalled in the House for a host of reasons; some political, and some substantive concerns over the cost and attainability. Many clean energy advocates agreed that confusion over the FIT v. RPS debate played a role in derailing renewable energy policy that year.

In 2010, Rep. Paige Kreegel was removed from the House energy committee by Republican House leadership, presumably for his support of a FIT policy. Senate leadership expressed a willingness to once again pass a RPS bill in 2010, if the House leadership would show willingness to do the same. Therefore, the attention of Clean Energy advocates shifted to the House energy committee and its new chairman, Representative Stephen Precourt.

[228] See SB 21154 at: http://www.flsenate.gov/cgi-bin/view_page.pl?Tab=session&Submenu=1&FT=D&File=sb1154.html&Directory=session/2009/Senate/bills/billtext/html.

RPS Fails Again in 2010

The Committee established priorities to guide it through its deliberations. The principles included, in order of importance: ensuring adequate and reliable energy supply, minimizing cost volatility, mitigating adverse environmental impacts and promoting investment and job creation.[229]

SACE Executive Director Stephen Smith and other SACE representatives appeared before the House energy committee and highlighted how a meaningful renewable energy policy, could meet those objectives. The commission held several hearings and received oral testimony. Yet, it was understood that a bill was being discussed and drafted by the committee chairman and House leadership outside of the open committee process. The bill that emerged called for 700 MW of renewable energy in 3 years. It permitted the state's IOUs to decide how much renewable energy would ultimately be built and who would build it, subject to a 2 percent rate impact cap. The bill was labeled as patently inadequate to drive a renewable energy market in Florida by clean energy advocates because of the lack of transparency and certainty.[230] This bill passed the Florida House of Representatives, but never made it to the Senate floor for a vote.

The FIT advocates filed another bill that creatively established a production based incentive funded through a Public Benefit Fund. They enlisted the Florida Farm Bureau's support and titled the bill the *Farm to Energy Act*.[231] Stung from the legislative rebuke from the previous legislative session, its advocates never used the label "feed-in tariff." The rate impact of the bill was left to FPSC determination as were the differentiated tariff payment by technology and size. This bill failed to make it out of the energy committee. One political drawback of the bill may have legislators' unwillingness to add charges to electricity customer's bills. While the proposed legislation failed, it was a program that could have been implemented in Florida without triggering federal preemption.

The Florida House leadership appeared to have a conservative ideological bias towards any renewable program that could be deemed a government "mandate." An RPS clearly fell into that label. The bias was most evident in its press release of the passage of a bill that gave municipalities the authority to execute property assessed clean energy (PACE) programs. In describing the benefit of the PACE bill, House leaders called them as "no cost to taxpayers," "no-subsidy," "no mandate'" "opt-in" approach.[232] Ultimately, no comprehensive renewable energy bill passed the Florida legislature in 2010.

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[229] House Energy Utilities Policy Committee, February 3, 2010, at: http://www.myfloridahouse.gov/Sections/Committees/committeesdetail.aspx?SessionId=64&CommitteeId=2472.

[230] See HB 7229, at: http://www.flsenate.gov/cgi-bin/view_page.pl?Tab=session&Submenu=1&FT=D&File=hb722900.html&Directory=session/2010/House/bills/billtext/html.

[231] See Farm to Energy Act, at: http://www.flsenate.gov/data/session/2010/Senate/bills/billtext/pdf/s2346.pdf.

[232] Florida House of Representatives, *House Leaders to Pursue Financing initiative to Create Jobs, Expand Clean Energy Technology to Florida*, News Release, February 3, 2009.

While the state House and Senate conservative leadership will continue to hold power in the upcoming legislative session, there is a sense among clean energy advocates that a renewable energy policy will be passed in 2011. The state's economic decline and clean energy advocate's calls for "green" jobs is playing a significant role in forming leaderships agenda. Incoming Senate President Mike Haridopolos held a "Citizens for Clean Energy Summit in July 2010."[233] He has clearly taken an interest in passing renewable energy legislation this year. The panels and comments at the Summit focused heavily on last year's failed bill that would have granted the state's IOUs guaranteed cost recovery for 700 MW of renewable energy projects. The challenge in the 2011 session is for clean energy advocates is to transform that bill into a market-based RAM –type procurement program to create competition that will drive down costs for utility customers and diversify technology type and ownership.

The movement in Florida towards a renewable energy bill holds out the promise that the region's other states, with the exception of North Carolina that already has a RPS policy, will move to attract investment and create jobs through renewable energy policy. The recommendations in this report can help drive the region towards accelerated development of renewable energy resources.

[233] *See* Citizens for Clean Energy, at: http://www.citizensforcleanenergy.com.

Appendix D

Backdrop: FIT and RPS Programs – Trend to More Certainty

The pursuit of policies that promote the development of renewable energy resources through production-based incentives has taken two distinctive policy tracks. In Europe, the FIT policy has been the primary tool that has driven the growth of the renewable energy sector. Nineteen European Union (EU) countries and non-EU countries, such as Switzerland, Ukraine and Albania have adopted FIT policies. Some form of FIT policy is found on almost every continent, from Asia and Africa, to Europe and North America.

Germany leads the world in installed capacity for both solar PV and for wind energy. The FIT program has been the main driver behind the development. Renewable sources of energy comprised 14.2 of the national energy portfolio in 2007, and the government has revised its long term target to 30% by 2020.[234]

Like Germany, Spain's FIT has also been a driver in the rapid deployment of renewable energy. By the end of 2007, Spain had installed 15,145 MW of wind capacity and 500 MW of solar PV capacity. In 2008, Spain had 16,740 MW of wind capacity, third only to the US and Germany, and 3,300 MW of grid-connected solar PV, second only to Germany.[235]

The most important element of FIT policy design cited by FIT advocates is the guarantee of reliable, long-term revenue stream.[236] The development of renewable energy in Germany, and the fully subscribed program in the City of Gainesville, are often cited as successful examples of FIT programs; and that investor interest will flow to programs that are certain, transparent and that cover the cost of renewable energy generation with a stipulated return on investment.

The enthusiasm by investors about certainty that FIT programs provide has recently been tempered by Spanish prospective reductions in payments to solar developers that have executed contracts.[237] The German government (and other governments) is considering significant cuts in its tariff rate for future projects.[238]

The fundamental difference between an RPS and a FIT is that generally an RPS sets the target and lets the market decide the price to achieve the target, whereas; a FIT typically establishes a long term price and lets the market decide how much renewable capacity is developed.

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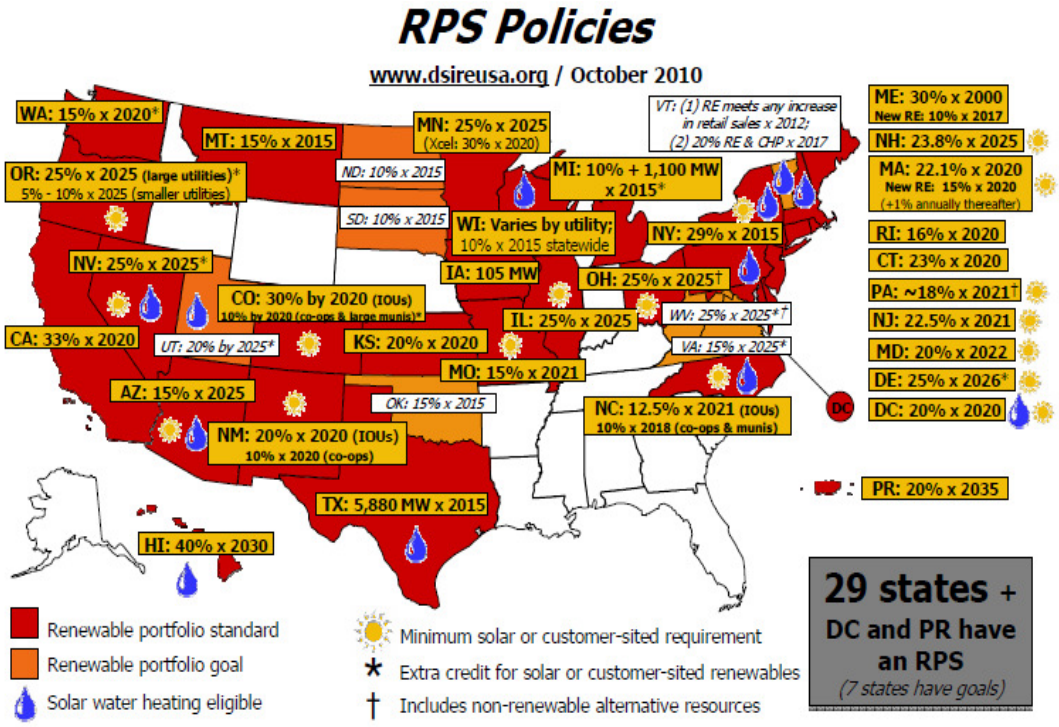
[234] *See* KEMA, Inc., *California Feed-In Tariff Design and Policy Options*, May 2009
[235] *Id.* at 17.
[236] *See* DB Climate Advisors, *Paying for Renewable Energy: TLC at the Right* Price, December 2009.
[237] Eric Rosenbaum, *Solar Grinch: Spain Does the Unthinkable*, The Street, December 28, 2010.
[238] Eric Rosenbaum, *Solar Losers: Decline and German Noise Continues*, The Street, January 28, 2011.

The RPS has been the policy of choice in the U.S. There are currently 29 states and the District of Columbia and Puerto Rico that utilize the policy. Forty percent of U.S. load was subject to an RPS in 2009.[239] An RPS is sometimes referred to as a "quota" policy since it requires a certain retail load to be met through renewable energy. The map below indicates the states that utilize an RPS policy.

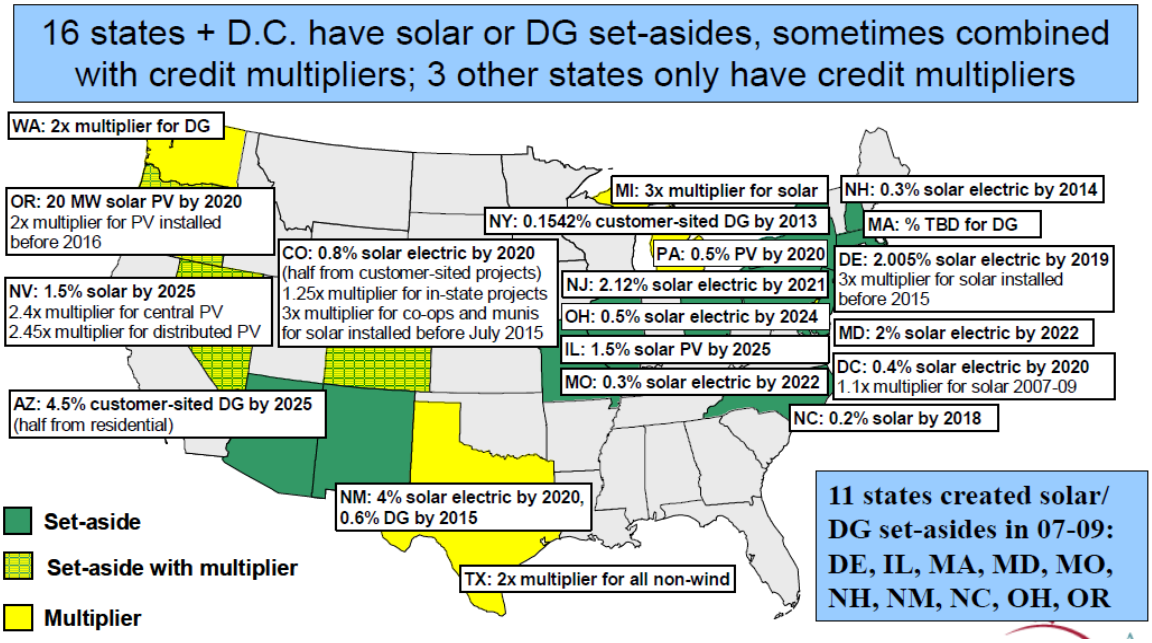


RPS Trends: Increased Targets, Set-asides, and Longer Term Transparent Contracts

Increased targets: RPS policies have exhibited success in driving renewable energy development in the US. From 1998 to 2007, an estimated 8,900 MW of new non-hydro renewable capacity was developed in the U.S. More than half of that was built in states with a RPS.[240] The trend in states with an RPS is to set even more ambitious targets. California, for instance, has increased its target by executive order to 33 percent by 2030, Hawaii has increased its target from 20 percent in 2020 to 40 percent in 2030, and Nevada has gone from 20 percent in 2020 to 25 percent in 2025.[241] Additionally, states are moving to include smaller sized utilities in their RPS programs.[242]

[239] Wiser & Barbose, State of the States: Update on RPS Policies and Progress, pp. 5, 9, November 18, 2009.
[240] Cory, et al., *Feed in Tariff Policy: Design, Implementation, and RPS Policy Interactions*, p. 8, March 2009. Although, it is difficult to demonstrate that RPS policies were the only factor for driving renewable energy development.
[241] Wiser & Barbose, State of the States: Update on RPS Policies and Progress, p. 8, November 18, 2009.
[242] *Id.*

Set-asides: set-asides, often called "carve-outs," are playing a larger role in state RPS policies. A carve-out is an amount within an RPS that must be met by a specified technology or sized project. For instance, Oregon has a set-aside for 20 MW of solar PV by 2020. Colorado combines its set-aside of 0.8 percent of electricity generation by 2020 with a requirement that half of the systems are customer-sited. The intent in Colorado is to encourage a significant amount of solar PV distributed generation. Set-asides will require 500 MW in 2010, with the requirement growing to 8,500 MW in 2025.[243] The map below highlights the extensive use of set-asides by U.S. states.[244]



REC challenges

A REC is the "currency" of an RPS. A REC represents 1 MWh of electricity produced with a renewable energy source. It serves as a compliance mechanism and as a financial incentive. The legal rights associated with the REC include the right to sell it within the rules of the tracking system and the ability to demonstrate compliance with a renewable purchase mandate. The financial value of a REC is that it provides the added revenue stream that may make the project economically viable when coupled with the payment for power.

While RECs are now widely used as the preferred means of demonstrating RPS compliance, REC definitions are not uniform. States have defined RECs differently based on factors such as different eligible resource definitions. As a result, there are multiple state and regional markets for RECs, hence fungibility across REC markets is limited.[245]

[243] *Id*. at 27.
[244] *Id*. at 13.
[245] *Id*. at 37.

Most states require that the targets be met with RECs from generation delivering electricity to the state, although some states, such as North Carolina, allow a stipulated percentage of compliance to be met with RECs from outside the state. The REC sales are generally tracked electronically.

Typical REC contracting practices and prices vary across states. Some state RPS markets primarily encourage short-term trade in unbundled RECs. This is most often in deregulated states where retail choice makes future load obligations of load serving entities more uncertain. Some REC markets have relied on a mix of short term and long term trades, where the purchase might be "bundled" with both the REC and the underlying purchase for power.[246] Since the REC markets operate within the individual states, the U.S. REC market is highly fragmented. Spot REC prices have varied substantially across different regions and resource types, and price fluctuations are possible even in a particular state over time. [247]

Trend Toward More Certainty in RPS Programs

RPS programs are adopting longer term contracting and a more open contracting process – which is a characteristic associated with FIT programs. Renewable projects are capital intensive, and concerns about the challenges of project financing with REC price variability has spurred a host of states to adopt provisions for longer term contracting. Long term contracting is one characteristic of renewable policy design that promotes investor certainty. The investment community requires assurances of long term steady payments to finance renewable energy projects.[248] The contract duration requirements, of the states listed below, [249] approach the contract duration of some traditional FIT polices. For instance, the Colorado 20 year contract duration represents a long-term contracting period characteristic of a traditional FIT program.

[246] *Id*. at 18.
[247] Wiser & Barbose, *Renewables Portfolio Standards in the United States*, LBNL, April 2008
[248] *See* DB Climate Advisors, *Paying for Renewable Energy: TLC at the Right* Price, December 2009.
[249] Wiser & Barbose, *State of the States: Update on RPS Policies and Progress*, LBNL, p. 18, November 18, 2009
.

States with Long Term Contracting Requirements

CA	10 + years
CO	20 + years
CT	100 MW, 10 + years
IA	ownership or long term contract
MD	solar, 15 + years
MT	10 + years
NV	10 + years
NC	solar, sufficient length to stimulate development
PA	good faith effort includes seeking long term contracts
RI	90 MW average, 10 + years

Trend Towards Standard Offer Contracts in RPS States

It is important to note that while these are long term contracts, they are not necessarily standard offer contracts; they may simply be longer term negotiated contracts. For instance, Nevada's long term contract is a negotiated contract, while California and Colorado both have long-term standard offer contracts and negotiated contracts (depending on system size).

The "standard offer" certainty and transparency is highlighted as an important component of a FIT policy. The case is often made by FIT advocates that transparency of standard offers in ensuring transparency, maintain low transaction costs and create an environment where both large and small developers can participate.[250]

Standard Offer defined:

A standing offer by an electric utility generator or distributor to enter into a contract with all qualifying renewable energy generators that provides a non-negotiable price with set terms and conditions.

Several utilities offer standard offer contracts for solar projects to meet RPS requirements.

- Arizona Public Service offers 10 to 20 year contracts for solar RECs with prices at 18.2 cents/kWh and 22.5/kWh respectively. Small systems are offered an up-front payment of $2.50/watt DC, in exchange for the estimated REC production from the system.[251]

[250] *See* DB Climate Advisors, *Paying for Renewable Energy: TLC at the Right Price*, December 2009
[251] APS, *APS Green Choice,* at: http://www.aps.com/main/green/choice/choice_67.html (last visited November 15, 2010)

- PNM - New Mexico offers 20-year contracts for solar RECs that start at 12 cents / kWh for systems under <10kW. REC payments decrease in steps as capacity thresholds are met.[252]

- Xcel Energy – Colorado offers 20 year contracts for solar RECS as follows: Systems 0.5 kW - 10.0 kW – 7 cents / kWh; Systems 10.1 kW - 100.0 kW – 3.5 cents /kWh; and Systems 100.1 kW - 500.0 kW – 4.5 cents /kWh.[253]

- Progress Energy Carolinas (PEC) began offering incentives to *non-residential* customers in North Carolina and South Carolina for generating electricity from solar PV systems in July 2009. PEC will pay 18 cents /kWh for the electricity and RECs generated by the PV system for a period of 20 years to help it comply with its REPS requirement.[254]

One of the cited benefits of the standard offer is lower transaction costs – especially for developers of smaller scale projects. Contracts with standard offers that are open to all eligible applicants are said to reduce transaction costs for both buyer and seller and are more transparent to administer than the current RPS / REC bidding or negotiation system. Time and resources are required to develop a project and bid or negotiate contracts for sale of power and RECS. Consequently, the required return on investment for competitive bidding or negotiations is higher than in jurisdictions with FIT.[255]

While these transaction costs may represent only a small percentage of the project, they increase the return on investment requirement, which in turn increases the required payment price for renewable electricity. The overall market structure that results from a competitive bidding framework tend to make it more difficult for small developers to participate and limit the investor pool. That can lead to poor attainment results.

Comments by the California PSC Economic Division Staff regarding the recently adopted RAM program echoes concerns over transaction costs.

> California offers various programs and incentives for renewable energy development. The state has renewable programs that target both large and small renewable projects. While the current programs have been successful at creating a renewable market in California, they do not target system-side renewable [distributed generation] DG. Renewable projects of this size either are not eligible for the self generation programs or do not have an economic incentive to participate. On the other hand, these types of renewable projects are very interested in participating in the Renewable

[252] PNM, *PNM Solar Energy Incentive Program*, at: http://www.pnm.com/customers/pv/program.htm
[253] Xcel Energy, *Current Solar Rewards MW Confirmed*, at: http://www.xcelenergy.com/Colorado/Residential/RenewableEnergy/Solar_Rewards/Pages/CurrentPricing.aspx (last visited November 15, 2010).
[254] PEC, *SunSense Carolina*, at: http://www.progress-energy.com/environment/ras/sunsense/car/sunsensecar.asp (last visited November 15, 2010).
[255] Cory, et al., *Feed in Tariff Policy: Design, Implementation, and RPS Policy Interactions*, p. 9, March 2009.

> Portfolio Standard (RPS) program, but do not have the financial resources or staffing to develop a detailed project bid or negotiate contract terms and conditions with the IOU.[256]

RPS and FIT Policy Interaction

Incorporating a FIT into a RPS policy can provide benefits in meeting state RPS targets. The recently adopted Renewable Auction Mechanism (RAM) in California, for instance, is intended to help the state's IOUs meet their compliance targets by encouraging projects in the 1 MW to 20 MW project size.[257]

The primary reason to integrate a FIT into an RPS policy is to improve project financing support.[258] Not all states have RPS design elements that support financing for smaller renewable energy projects. Such features would necessarily include long term contracting and standard offer provisions. Without long-term support to secure investment, renewable projects will likely have difficulty securing financing, which could result in a shortage of supply to meet RPS demand. FIT policies can provide the certainty of a revenue stream that project investors require and can ensure that enough renewable energy supply will be created. The California Attorney General has recently called FIT programs an "essential element" in California's effort to meet its 33% RPS target by 2020.[259]

A FIT program for small to mid size projects can act as hedge for problems in siting larger projects. The California RPS, for instance, is largely designed around utility scale solicitations to procure least-cost viable renewable projects. Larger projects that can use economies of scale to reduce energy costs tend to be more competitive in these solicitations. As a result, RPS projects tend to be large and located in remote areas with abundant available land, but little transmission access or capacity.

Project financing, siting and access to the transmission system can challenge even the best and most economical renewable projects. These larger projects take several years, at a minimum, to develop, due to the generation and transmission permitting processes, as well as the construction time required.[260] Consequently, despite California's requirement for an RPS of 20 percent by the end of 2010 and a goal of 33 percent renewable power by 2020, the actual percentage of renewable generation has hovered for several years near 13

[256] CPUC Energy Division Staff, *CPUC Staff Proposal on System-Side Renewable Distributed Generation Pricing,* Attachment A, p.2, August 26, 2009.
[257] Paul Douglas, *Renewable Auction Mechanism: New Procurement Tool for Renewable Generation*, California Public Utilities Commission, January 19, 2010
[258] *Id.*
[259] Edmund G. Brown, et al., *California Attorney General Response to ALJ's Request for Briefs Regarding Jurisdiction to Set Prices for a Feed-In Tariff*, Docket No. R0808009. August 21, 2008
[260] CPUC Energy Division Staff, *CPUC Staff Proposal on System-Side Renewable Distributed Generation Pricing,* Attachment, p. 2, August 26, 2009.

percent;[261] although CA IOUs are expected to reach the 20% RPS in the 2011-2012 timeframe.[262]

A FIT can provide more certainty than an RPS that projects granted contracts will actually get built. Similar to other power production, utilities must justify their costs for RPS compliance, whether through power purchase agreements or utility-owned projects. While the focus on "least-cost" principles attempts to minimize ratepayer costs, they may pressure utilities to negotiate contract prices for renewable projects that are inadequate to secure financing. If a utility's renewable procurement process does not consider the likelihood that a project will be developed, and just considers lowest cost, then it is likely that not all of the projects under contract will be built – the utility, therefore, is less likely to meet its RPS requirement.[263]

Lastly, new or emerging technologies may not be able to secure financing, even with long-term utility contracts. The projected revenues need to be high enough to support the additional investment risk faced by investors. This higher risk requires higher returns on investment than commercially available renewable energy projects. FIT polices that differentiates tariffs by technology, would provide this risk premium for emerging technologies and provide the long-term certainty required by those project investors.[264]

[261] Edmund G. Brown, et al., *California Attorney General Response to ALJ's Request for Briefs Regarding Jurisdiction to Set Prices for a Feed-In Tariff*, Docket No. R0808009. August 21, 2008. Although, once contracted projects are fully developed, CA IOUs will come close to meeting their 2020 targets..
[262] Paul Douglas, *Renewable Auction Mechanism: New Procurement Tool for Renewable Generation*, California Public Utilities Commission, January 19, 2010.
[263] Corey, et al., *Feed in Tariff Policy: Design, Implementation, and RPS Policy Interactions*, p. 10, March 2009.
[264] *Id.*

Appendix E

Legal constraints

Introduction

State-wide FIT program implementation presents a challenge because of federal preemption of the Public Utility Regulatory Policies Act (PURPA) and the Federal Power Act (FPA). The FPA makes it unlawful to make a sale of electricity at wholesale without proving to the Federal Energy Regulatory Commission (FERC) that the price is just and reasonable. PURPA limits the purchase of power by a retail utility from a qualifying facility (QF) to the utilities avoided cost.

While the PURPA limitations were affirmed by a FERC order in July 2010,[265] a January 2011 order seems to permit multi-tiered avoided cost structure depending on the type of generation resource that is being "avoided" by the purchase of power from different renewable energy technologies.[266] Therefore, state utility commissions could have the leeway to set more attractive avoided cost rates for the procurement of renewable energy from renewable energy owners. This is a quickly evolving area of regulation that warrants monitoring and holds the potential for future IOU FIT program advocacy in the Southeast region.

This section offers two prospective paths for states to implement FIT programs consistent with federal law that provide payments above the utility's avoided cost to renewable project owners.

1. States may rely on the utility's PURPA purchase obligation for state-level FIT programs. This path requires that states create an incentive payment above avoided cost fashioned in one of several prescriptive ways; or
2. States may rely on state law independent of PURPA, but subject to the FPA. This path allows the state to require state utilities to *offer* to purchase power at a cost-based or negotiated price, but subject to FERC approval.

[265] FERC Declaratory Order 132 FERC ¶ 61,047 of July 15, 2010. A more recent FERC ruling has granted state utility commissions greater latitude in determining avoided cost. *See* FERC Clarifying Order 133 FERC ¶ 61,059, October 21, 2010

[266] FERC Order 134 FERC ¶ 61,044, January 20, 2011 ("[b]ecause avoided cost rates are defined in terms of costs that an electric utility avoids by purchasing capacity from a QF, and because a state may determine what particular capacity is being avoided, the state may rely on the cost of such avoided capacity to determine the avoided cost rate. Thus, the avoided cost rate may take into account the cost of electric energy from the generators being avoided, e.g., generators with certain characteristics.").

FPA Overview

The Federal Power Act has placed in FERC the exclusive authority to regulate the sale of electric energy at wholesale in interstate commerce. It is unlawful to make an electricity sale at wholesale without proving to FERC that the price is just and reasonable and not unduly discriminatory.

FERC's exclusive authority under the FPA is to regulate the sale of wholesale electric energy in interstate commerce. Section 201 of the FPA states:

> It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution for the public is affected with a public interests, and the Federal regulation of that part of such business which consists of the transmission of electric energy in interstate commerce and the sale of such energy at whole in interstate commerce is necessary in the public interest, such Federal regulation, however, to extend only to matters which are not subject to state regulation by the states.

Under the FPA, the term "interstate commerce" has a well established definition. All wholesale transactions within the interconnected grid, even if the contractual origin and destination are within a single state, are within interstate commerce and subject to FERC's jurisdiction.[267]

The FPA does not apply to Hawaii, Alaska, and most of Texas because these areas do not have direct interconnections with utilities in other states that allow unimpeded flow of electricity across systems.[268]

FERC exclusive authority over wholesale sales does not mean that U.S. law bars state-level feed-in tariffs outside of PURPA. States can design a FIT program if the tariff is structured as a utility's *offer* to buy at a cost-based price or a negotiated price, subject to FERC approval. Under Sections 205 or 206 of the FPA, the seller must prove to FERC, that the contract, including its price, is "just and reasonable" and not "unduly discriminatory." To receive FERC approval, the wholesale seller must choose one of two procedures:

- ***Cost-based rates:*** *"*The seller signs a contract with the utility buyer, and then submits that contract to FERC for review. FERC establishes a public proceeding to review the seller's cost data (which the seller must make public)."[269]

[267] *FPC v. Florida Power and Light Co*., 404 U.S. 453, 454-55 (1972) (recognizing that electrons from intrastate sale in Florida move in interstate commerce because of commingling of intrastate and interstate power at point of interconnection with out-of-state utility). *See also*: *Lockyer v. Dynegy, Inc.,* 375 F.3d 831, 850 (9th Cir. 2003). The "scope of this authority is not amenable to case-by-case analysis, but rather represents a bright-line rule."

[268] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL p. vii, January 2010; *see also*; Kevin Fox, *Solar Feed-In Tariff Pricing in the US, Practical Approaches to Establishing Wholesale Programs at the State Level*, March 8, 2010.

- ***Market-based rates:*** "Instead of seeking approval contract-by-contract, the seller seeks from FERC a blanket approval to enter contracts at will, at whatever price the seller and buyer negotiate. To gain FERC's approval, the seller must submit a detailed technical study proving that it has no "market power," i.e., no ability to set and sustain prices above competitive levels, in the markets in which the seller intends to sell."[270]

Public Entities

It should be noted that government entities and publicly owned utilities are not subject to the FPA. Section 201(f) of the FPA provides:

> No provision in this Part [16 U.S.C. sec. 824 et seq.] shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State, or any agency, authority, or instrumentality of any one or more of the foregoing, or any corporation which is wholly owned, directly or indirectly, by any one or more of the foregoing, or any officer, agent, or employee of any of the foregoing acting as such in the course of his official duty, unless such provision makes specific reference thereto.

Therefore, a municipal power system or government entity can offer a feed-in tariff, as long it is not offered in the context of meeting its PURPA obligation.[271]

Hence, TVA, Gainesville and SMUD[272] are not subject to the FPA and can establish FIT programs, with price points above avoided cost, as long as it is not in pursuit of its PURPA obligations. This suggests that the path of least legal resistance to widespread FIT implementation is through large government entities like TVA and municipally owned utilities.

The exception provided for government-owned utilities suggest significant potential for the advancement of FIT programs nationally. There are more than 2,000 publicly owned power systems that include local, municipal, state, and regional public power systems. These providers range from tiny municipal distribution companies to large systems such as the Los Angeles Department of Water and Power. Publicly owned systems operate in every state but Hawaii. About 1,840 of these systems are cities and municipal governments that own and control the day-to-day operation of their electric utilities.[273]

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[269] *Id.*
[270] *Id.*.
[271] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 2, January 2010.
[272] Kevin T. Fox, *Solar Feed-In Tariff Pricing in the US, Practical Approaches to Establishing Wholesale Programs at the State Level*, March 8, 2010.
[273] *See* The Electric Energy Market Competition Task Force, *Report to Congress on Competition in Wholesale and Retail Markets for Electricity*, at: http://www.ferc.gov/legal/fed-sta/ene-pol-act/epact-final-rpt.pdf

Electric Cooperatives

Electric Cooperatives also play a role in delivering power in the Southeast and should be distinguished from municipal utilities.[274] A municipal utility is a provider of electricity services owned and operated by a governmental entity. An electric cooperative is owned by the members they serve, and provide at-cost electric service to their members. Each cooperative is governed by a board of directors that is elected by the membership. Electric cooperatives that receives financing from the Rural Electrification Act and generate less than 4 million megawatt hours (MWH) annually are also exempt from FERC jurisdiction over whole sale power purchases.[275]

PURPA Overview

State commissions have limited authority to set the price for power under PURPA. It requires retail utilities to buy power from QFs at the utilities' avoided cost. Under PURPA, two types of facilities are eligible for QF status: small power production and cogeneration facilities.[276] To become a QF, a small power production facility must meet the size and fuel requirements set out in FERC's regulations.[277]

While FERC determines QF status, a state legislature, or more likely as state utility commission, determines the utilities' avoided cost. Avoided costs means the incremental cost of alternative energy, defined by PURPA as "the cost to the electric utility of the electric energy which, but for the purchase from such cogenerator or small power producer, such utility would generate or purchase from another source."[278] A state commission therefore, cannot mandate that power be purchased by state utilities from renewable energy developers above the utility's avoided cost.

Paths to Non-Preemption Under PURPA

The key to non-preemption is providing to renewable energy developers compensation that is not a payment for the purchase of power. There are three additional payment streams under state control that don't implicate federal statute. They paths include RECs, tax credits and payments from other non-rate-based sources – such as a PBF.[279]

1. Renewable Energy Credits awarded to the renewable seller

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[274] Florida has 18 electric cooperatives that serve 10% of the state's population. *See* http://www.feca.com/members.html. North Carolina has 26 electric cooperatives that supply electricity to almost 1 million customers. *See* http://www.ncemcs.com. There are 22 electric cooperatives in Tennessee. *See* http://www.tnelectric.org.
[275] *See* www.ferc.gov/eventcalendar/Files/20051015140811-ER05-1381-000.pdf
[276] 16 U.S.C. § 824a-3(a).
[277] 18 C.F.R. 292.203(a).
[278] 16 U.S.C. §824a-3(d).
[279] Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, p. 14, January 2010.

A REC is a tradable commodity representing proof that a unit of electricity (e.g., 1 MWh) was generated from an eligible renewable energy resource. A utility must produce renewable energy itself to obtain a REC or it must procure it from a 3rd party – generally an in-state renewable energy developer to comply with state mandated targets for renewable energy generation.

Therefore, the REC serves as a compliance mechanism, and as a financial incentive in a state RPS. The financial value of a REC offers states one way to compensate renewable generators above the utility's avoided cost. The renewable energy developer can sell the REC with or separately from the energy produced. The extra compensation does not violate PURPA's avoided cost provisions. FERC has held that:

> RECs are relatively recent creations of the States. Seven States have adopted Renewable Portfolio Standards that use unbundled RECs. What is relevant here is that the RECs are created by the States. They exist outside the confines of PURPA. PURPA thus does not address the ownership of RECs. And the contracts for sales of QF capacity and energy, entered into pursuant to PURPA, likewise do not control the ownership of the RECs (absent an express provision in the contract). States, in creating RECs, have the power to determine who owns the REC in the initial instance, and how they may be sold or traded; it is not an issue controlled by PURPA.[280]

FERC thus found states have authority that is unrestricted by federal law to create RECs and determine procedure for their purchase and sale. Since FERC doesn't consider a REC to be part of an energy or capacity payment, the REC compensation to a third party seller of power will not violate PURPA provisions.

2. Tax credits awarded to the utility purchaser

FERC allows a state to set a PURPA purchase price exceeding a utility's avoided cost if the state grants the purchasing utility a tax credit equal to the excess above avoided cost. In *CGE Fulton* FERC rejected a utility's challenge of an Illinois state programs that utilized tax credits as compensation. The state provided tax credits to participating utilities that equaled the incremental cost above avoided cost paid to renewable energy developers. The agency ruled that the use of the tax credit would effectively keep the rate equal to, not above, the utility's avoided cost – and therefore permissible.[281]

3. Payments to the renewable seller from other sources (i.e. PBF)

In *CGE Fulton*, FERC stated that "a state may choose to grant loans, subsidies or tax credits to particular facilities on environmental or other policy grounds" without violating PURPA. This general statement opens many doors for a state seeking to grant the seller

[280] *American Ref-Fuel Co*., 105 FERC ¶ 23, 61,004 (2003).
[281] CGE Fulton 70 FERC § 61,290 (2009), *see also* Hempling, et al., *Renewable Energy Prices in State-Level Feed-in Tariffs: Federal Law Constraints and Possible Solutions*, NREL, January 2010.

compensation exceeding utility avoided cost. Tax credits to the seller, cash payments emanating from system benefit charge revenues, cash payments flowing from general tax revenues (upfront or production based), funding from any source—all these options are available to the state when relying on PURPA as the mandate for utility purchases.[282]

[282] *Id.*

Appendix F

FIT Experience in the U.S.

FIT program designs vary widely in the U.S. The GRU FIT program is a generation cost-based program built on the German FIT model. Other programs provide a payment rate on a value-based method, such as the utility's cost to procure power during certain times of the day plus system benefits. A new Renewable Auction Mechanism (RAM) model has recently emerged in California that will utilize a market-based auction system to set the FIT payment rate. Some of the models are highlighted below.

A Sampling of Existing U.S. FIT Programs

	Gainesville	**TVA GP**	**VT**	**CA-RAM**	**SMUD**
Program Size	32 MW	200 MW	50 MW	1,000 MW	100 MW
Project Size Cap	250 kW	200 kW	2.2 MW	1-20 MW	5 MW
Above PURPA Avoided Cost	Yes	Yes	Yes	Yes, if funded	Yes
Solar only	Yes	No	No	No	No
Rate Differentiation	Yes	Yes	Yes	Set by Auction	No (except for CHP)

City of Gainesville

Start Date:
March 1, 2009

Eligible resources:
Solar PV

Program Description:
Gainesville Regional Utilities' (GRU) FIT program intends to deploy 32 MW of solar power by 2017. Gainesville's customer base is 92,000.[283] Relative to its customer base, the capacity additions of the GRU FIT is the most aggressive program in the country. Modeled on Germany's FIT, the GRU FIT purchases energy from qualified PV systems via standard offer contracts for period of 20 years. The program pays qualified solar PV systems up to 32 cents / kWh in 2010. The payments have been reduced for 2011 contracts.

The payments are guaranteed and fixed with tariffs differentiated by size and by roof mounted or ground mounted systems. The program is open to both residential and commercial customers but is capped to systems no greater than 250 kW. Its annual program cap is 4 MW, which it hit in 3 weeks after the program opened for application submittal in 2009. The second round of application acceptance for the 2011 tariffs began in January and was quickly subscribed. An independent 3rd party selected 55 projects from random drawing.[284] The program is limited to 4 MW annually in order to keep the rate impact at 0.6 percent.[285] About 90 percent of approved contracts are from commercial operations.[286]

The experience of the Gainesville FIT program, especially its strategy to mitigate rate impacts below a certain threshold, could be instrumental in policy design and political messaging decisions for similar program encouragement among other municipal utilities in Florida, North Carolina and throughout the Southeast.

Results:
The Gainesville FIT program cap of 4 MW for 2010 has already been met. More than 3 MW have been installed. The 2011 offering was quickly subscribed and 55 projects were selected. The overall program cap is 32 MW by 2017.

Trend:
GRU has undertaken several changes. The first is to make the program more accessible to residential projects. Since 90 percent of the approved contracts are from commercial operations, GRU is instituting a set-aside of 200 kW of capacity for residential systems of

[283] http://www.gru.com/AboutGRU/ourhistory.jsp.
[284] GRU, *Solar FIT*, at: https://www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp
[285] Conversation with Ed Regan, GRU's Assistant General Manager for Strategic Planning, July 2010
[286] *Id*. See also: *Gainesville Plans to Make Solar Feed-in More Available*, Gainesville Sun, July 2, 2020, at: http://www.gainesville.com/article/20100702/ARTICLES/100709937/1002?p=2&tc=pg.

no more than 10 kW.[287] Additionally, tariffs will be reduced for larger roof mounted and ground mounted systems, from 32 cents /kWh to 29 cents / kWh and 26 cents / kWh to 24 cents / kWh respectively. By 2013, Gainesville expects that 21% of its generation will be renewable and comprised of biomass, landfill gas and solar.[288]

GRU has encountered speculative queuing and has instituted rules that it hopes will limit it. GRU now charges a processing for an application and a $30/kW non-refundable fee. It has also established sequential benchmarks (as have other FIT programs) in its application process that applicants must meet; otherwise, they are removed from the queue. [289]

[287] GRU, *Solar FIT*, at: https://www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp
[288] Pegeen Hanrahan, *Green Jobs, Gainesville Vision of Growth*, February 3, 2009.
[289] Conversation with Ed Regan, GRU's Assistant General Manager for Strategic Planning, July 2010.

TVA – Generation Partners

Start Date:
2003, 2009

Eligible Resources:
Solar PV, biomass

Program Description:
The TVA GP program was restructured in 2009 with a new pricing structure and extended beyond the 50 kW size, to 999 kW sized systems.

TVA's GP is a pilot end-use renewable energy program that gives homeowners and businesses an opportunity to own and generate renewable energy. TVA will purchases 100 percent of the output from a qualifying system at a premium of 12 cent / kWh on top of the retail electricity rate for solar and 3 cents / kWh on top of the retail electricity rate for wind, low-impact hydro, and biomass. The installed capacity goal for the program is 200 MW with a project cap of 999 kW, and a cost cap of $50 million.

On April 1, 2010, TVA changed its rules to allow for consideration of applications for projects not yet constructed. TVA received 75 applications in 8 weeks – an unexpected surge in demand. TVA recognized that it could surpass its budgeted amount for the pilot program and ceased taking applications on June 16, 2010. It resumed the program one week later. TVA announced it would again accept all solar, wind and biomass installations, but only up to 200 kW.

Results:
TVA has 37 projects awaiting approval and another 25 in various stages of development. Of those projects, 29 of them represent one or more MW of capacity. TVA has approved a total of almost 500 projects totaling about 60 MW.[290]

Trend:
The GP program is still operational and has not yet hit its program cost cap. The TVA Board will be considering modifications to the GP FIT program to ensure more certainty to developers of smaller scale projects.

TVA announced in early October 2010 that it was initiating a new distinct standard offer contract program for systems from 201 kW to 20 MW. TVA's Renewable Standard Offer initially will be limited to a total of 100 megawatts from all participants, with no single renewable technology representing more than 50 megawatts of the total.[291]

[290] Communication with Susan Curtis, TVA Senior Project Manager for Generation Partners, October 2010.
[291] TVA, *TVA Launches New Renewable Power Initiative, Continues Generation Partners Growth*, October 8, 2010; see also TVA, *TVA Renewable Offer Fact Sheet*, at: http://www.tva.gov/renewablestandardoffer/renewable_standard_offer.pdf .

Vermont

Start Date:
September 30, 2009

Eligible Resources:
Solar PV, landfill gas, wind, biomass, biogas, and hydroelectric

Program Description:
In May 2009, Vermont enacted the Vermont Energy Act, which requires all Vermont retail electricity providers to purchase electricity generated by renewable energy sources with long term standard offer contracts, although projects must apply and be granted a "Certificate of Public Good." The program cap is 50 MW and the project cap is 2.2 MW. Owners of most systems may sign power-purchase contracts of 10 to 20 years, although contracts for solar power systems can run up to 25 years.[292]

Vermont's Public Utility Board set the program tariff rates as mandated in the Vermont Energy Act of 2009. The Board established interim standard offer rates and final standard offer rates. The rates include tariffs of 30 cents /kWh for solar PV, 12.5 cents /kWh for biomass and 12 cents /kWh for landfill gas. The only resource that is provided differentiated tariffs is wind.[293]

As a condition of the standard offer, the RECs generated are transferred to the retail electric provider that purchases the power from the renewable energy facility, except in the case of a facility using methane from agricultural operations. In that case, the plant owner retains ownership of the RECs and may sell them if desired. Retail electric providers and owners of renewable energy facilities may enter into voluntary contracts with different terms than the standard offer contract terms at their discretion.

The state is able to avoid PURPA preemption by using a state-run facilitator. The Sustainably Priced Energy Development Program (SPEED) was created in 2005 to promote the development of in-state renewable resources.[294] It is structured as a quasi-governmental entity, which removes that entity from FERC jurisdiction. Essentially, that entity acts like a municipal utility and is under state jurisdiction.[295]

Results:
The overall 50 MW cap was met within days of the program's opening and applications for each category of eligible renewable energy technologies were accepted. About 45 MW of projects are under contract as of July 2010.[296]

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[292] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=VT36F&re=1&ee=1.
[293] *Implementation of Standard Offer Prices for SPEED Resource*, Docket No. 7523, September 15, 2009.
[294] Vermont SPEED, at: http://vermontspeed.com.
[295] Communication with Kevin T. Fox, Keyes and Fox, LLP in August 2010.
[296] Lisa Schwartz, *Feed-in Tariffs in Oregon and Vermont*, Regulatory Assistance Project, p. 11, July 19, 2010.

California

Start Date:
2006, 2008, 2010

Eligible Resource:
Solar Thermal Electric, Solar PV, Landfill Gas, Wind, Biomass, Geothermal Electric, Municipal Solid Waste, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal, Biodiesel, Fuel Cells using Renewable Fuels.

Three FIT Program Descriptions:

- California's 2006 statute first authorizing FIT programs for certain facilities up to 1.5 MW used the State's legislatively-mandated 'Market Price Referent' (MPR) to establish the price for small renewable generators.[297] The MPR represents the cost to own and operate a baseload combined cycle gas natural gas power plant over various time periods. The cost of electricity generated form such a plant, at an assumed capacity factor and set of costs, is the proxy for the long-term market price of electricity.[298]
- California's 2009 statute[299] (known as SB 32) expanded the earlier FIT program to cover facilities up to 3 MW. In establishing the FIT price to be offered by IOUs, the statute –
    - expressly included avoided environmental compliance costs (for GHG emissions reductions, pollution offsets, etc.);
    - authorized the Commission to include time-of-day values; and
    - directed the Commission to consider assigning a value for electricity that could offset peak demand on the distribution circuit where the facility is located. Commission rulemaking for SB 32 began in January 2011.[300]

In addition to value- and generation-cost based FITs, a third model has recently emerged from a two-year proceeding before the California Public Utilities Commission.[301] This model, known as the Renewable Auction Mechanism or 'RAM' adapts earlier FIT programs to larger renewable energy projects (1-20 MW), and modifies key elements of those programs to protect ratepayer interests, streamline procurement processes, and ensure that viable projects result.

[297] California Public Utilities Code §§399.20, 399.15.
[298] California Public Utilities Commission Resolution E-4118, October 4, 2007, at p. 5. The 2006 FIT program, later extended to other facilities up to 1.5 MW, has not played a major role in increasing overall state renewable energy capacity, adding about 6 MW of capacity with 34.6 MW with signed contracts.
[299] Now California Public Utilities Code §399.20 (for IOUs) and §387.6 (for publicly-owned utilities).
[300] California Public Utilities Commission, *Administrative Law Judges Ruling Setting Schedule for Briefs on Implementation of Senate Bill 32*, January 27, 2011.
[301] Beginning in early 2009, as part of CPUC Rulemaking 08-08-009.

The RAM procurement program design includes[302]:

- pricing established through simplified market-based auction procurement, rather than administratively-set tariffs, to drive down costs;
- twice-yearly simultaneous procurement auctions by California's large IOUs, rather than a continuously-available tariff;
- selection based on least-cost, rather than first-come-first-served;
- non-negotiable prices based on submitted bids;
- non-negotiable contract terms and conditions; and
- viability screens to ensure that projects offered will actually get built.

Results:
The California IOUs collectively served 15.4% of their 2009 electric load with renewable energy under the RPS, up from 13% in 2008.[303] California has an aggressive RPS target of 33% by 2020 set by executive order. California's 2006 FIT program, with a maximum capacity of 1.5 MW, has not played a major role in increasing overall state renewable energy capacity, adding about 6 MW of capacity with 34.6 MW with signed contracts.[304] Yet, supply-side distributed generation developed through the RAM FIT program is expected to play an important role in deploying renewable energy projects in the 1 to 20 MW size that will be important program to help the state's IOUs meet their RPS requirements.[305]

Trend:
The CPUC has recently approved the RAM program and is moving ahead with rulemaking on Senate Bill 32.

[302] Paul Douglas, *Renewable Auction Mechanism: New Procurement Tool for Renewable Generation*, California Public Utilities Commission, January 19, 2010.
[303] *Id.; see also* California Public Utilities Commission, *Renewables Portfolio Standard, Quarterly Report,* 3rd Quarter 2010.
[304] National Association of Regulatory Utility Commissioners, Feed-in Tariffs, Frequently Asked Questions for State Utility Commissioners, p. 2, June 2010.
[305] Wei and Kammen, *Economic Benefits of a Comprehensive Feed-In Tariff: An Analysis of the REESA in California*, University of California, Berkeley, July 7, 2010. (The FIT can help fill the gap between the Million solar roofs residential initiative and industrial scale projects of 20 MW and larger).

Sacramento Municipal Utility District

Start Date:
January 1, 2010

Eligible Resources:
Solar Thermal Electric, Solar PV, Landfill Gas, Wind, Biomass, Geothermal Electric, Municipal Solid Waste, Anaerobic Digestion, Small Hydroelectric, Tidal Energy, Wave Energy, Ocean Thermal, Biodiesel, Fuel Cells using Renewable Fuels.

Program Description:
The SMUD) value-based FIT was designed for eligible renewable and CHP projects up to 5 MW. FIT rates reflect SMUD's marginal cost (market price, ancillary services, generation capacity, transmission and sub-transmission capacity), adjusted for time of delivery. For eligible renewables, the rates also reflect avoided GHG mitigation costs and natural gas price risks.[306] Together, the *costs and risks* that SMUD can avoid through FIT purchases comprise the value of those purchases to the utility and its customers.

The program is open to all renewable resources that are eligible to meet California's RPS. Since the FIT payment represents SMUD's marginal cost, adjusted for time of day delivery, the FIT payment varies by time of day, season, with the highest rates being paid during summer peak times. The project size cap is 5 MW and the program cap is 100 megawatts.[307] For solar PV projects with 20-year contracts started in 2010, the average weighted production payment is estimated to be 13.9 cents / kWh.[308]

Results:
The SMUD FIT program is fully subscribed and has received applications for more than the 100 MW program cap. Its first contract was signed on July 7, 2010 with Recurrent Energy for twelve 5 MW projects of solar PV power.[309] Recurrent will construct the 60 MW of solar PV at a price point of about 14 cents / kWh.[310]

[306] See SMUD's *Feed-In Tariff FAQs*, available at http://www.smud.org/en/community-environment/solar-renewables/pages/feed-in-tariff.aspx.
[307] *See SMUD's Feed-in Tariff*, at: http://www.smud.org/en/community-environment/solar-renewables/Pages/feed-in-tariff.aspx.
[308] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA207F&re=1&ee=1
[309] Financial Times, *SMUD Signs First FIT Contract with Recurrent Energy for 60 MW of Solar Power*, July 7, 2010.
[310] Adam Browning, *FERC Defines State's Feed-in Tariff Authority*, Greentechmedia.com, August 4, 2010.

Other Programs

San Antonio

CPS Energy is the nation's largest municipally owned energy company providing both natural gas and electric service. The utility serves 690,000 electric customers. The CPS Energy FIT program is relatively limited. The program is limited to 10 MW of solar PV over 2 years – effectively making this a FIT pilot program.

CPS Energy offers a tariff rate of 27 cents / kWh for solar PV systems located within its service territory through the Solartricity Producer program. The rate is available as a standard offer contract offer beginning June 15, 2010 for systems ranging from 25 kW to 500 kW.

In order to qualify for the program, systems must be at least 90% roof-mounted on buildings or structures. Ground-mounted equipment may comprise no more than 10% of project. The utility intends to enter contracts with up to 5 MW of qualifying projects annually for two years. The first application period began June 15, 2010.[311] The program is fully subscribed for the first year and has projects waiting in a queue.[312]

Maine

Maine Governor John Baldacci signed the Community-Based Renewable Energy pilot program into law on June 24, 2009. To qualify for the pilot feed-in tariff, 51 percent of the project must be owned locally. Local ownership is defined as residents of the state, schools, public institutions, tribes, non-governmental organizations, or corporations that are 51 percent owned by state residents.[313]

The provisions of the program include:

- Project size cap: 10 MW
- Program size cap: 50 MW
- Program Cap for any one utility: 25 MW
- Microgenerator set aside: 10 MW
- Contract Term: up to 20 years
- Tariff: no more than 10 cents / kWh averaged over the life of the contract

Tariffs under the program will be determined by Maine's Public Utilities Commission for wind, solar, and any other renewable resource upon request. Tariffs for each technology

[311] Database of State Incentives for Renewables and Efficiency, at: http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=TX106F&re=1&ee=0

[312] Solartricity Project Queue, at: at: http://www.cpsenergy.com/files/Solartricity_Project_Queue.pdf (last visited November 10, 2010).

[313] Maine Public Utilities Commission, *Community-Based Renewable Energy Pilot Program* at: http://www.state.me.us/mpuc/electricity/community_pilot.shtml (last visited November 15, 2010)

will be determined by the Commission based on the cost of the project and "a reasonable rate of return" but cannot exceed 10 cents / kWh over the life of the contract.[314]

For comparison, the Vermont FIT program pays between 14 cents and 20 cents / kWh for wind energy and 30 cents / kWh for solar PV, and the GRU FIT program paid 32 cents /kWh for solar PV in 2010. As such, Maine's FIT payment is among the lowest in North America - even lower than the tariff in California set at the MPR in 2009.[315]

Hawaii

In September 2009, the Hawaii Public Utilities Commission (HPUC) issued a decision that established a feed-in tariff in Hawaii. The feed-in tariff will be offered by the three investor-owned utilities: HECO, MECO and HELCO. In October 2008, the PUC opened a docket to review the development of a feed-in tariff. The creation of the feed-in tariff is in accordance with the Hawaii Clean Energy Initiative. The stated goal of the program is to reduce the island's dependence on oil.

Several renewable energy technologies are eligible for the feed-in tariff, including solar PV, concentrating solar power, on-shore wind and in-line hydropower. Under this program, qualified projects will receive a fixed rate over a 20-year contract. The HPUC must still set the rate for different renewable energy technologies. This program will be reviewed by the HPUC two years after the start of the program and every three years thereafter.[316] Other components of the program include:

- Three size tiers:
    - <20 kW
    - >20 kW to <500 kW
    - >500 kW to <5 MW
- Program cap of 5 percent of peak demand on each island. Reserves bulk of new generation to large, central-station wind projects under an RFP.
- Initial review within two years; every three years thereafter.
- Reserves 5 percent of system cap for projects <20 kW.
- Cost of generation placed on ratepayers as a renewable energy surcharge. [317]

[314] Database of State Incentives for Renewable and Efficiency, at: http://www.wind-works.org/FeedLaws/USA/NRELFeed-inTariffsLegalinUSAWhenCertainConditionsMet.html.
[315] Paul Gipe, Timid Maine Community Based FIT Becomes Law, Wind-works.org, July 9, 2009.
[316] Database of State Incentives for Renewables and Efficiency, at: http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=HI29F&re=1&ee=1.
[317] Paul Gipe, *Hawaii PUC Decision on Feed-in Tariffs Summary*, Wind-works.org, October 7, 2009.