The Florida Senate

Issue Brief 2010-308 *October 2009*

Committee on Communications, Energy, and Public Utilities

ISSUES INVOLVED IN PROVIDING AN ECONOMIC INCENTIVE TO ENABLE EXPANSION OF RENEWABLE ENERGY

Statement of the Issue

Renewable energy costs more to produce than conventional energy, so an economic incentive is necessary to increase its use. The Florida Legislature has considered a variety of incentives over the last 10 years. In the beginning, the focus was on use of renewable energy to produce electricity. In recent years, the focus has broadened to include renewable motor vehicle fuels.

The existing statutory incentives include:

- A requirement that each electric utility[1] purchase electricity from any cogenerator[2] or small power producer[3] that is located in the utility's service area (unless the cogenerator or small power producer chooses to sell the electricity to another electric utility in the state), with the purchase price for a public utility[4] set at the purchasing utility's full avoided costs, which are defined as "the incremental costs to the utility of the electric energy or capacity, or both, which, but for the purchase, the utility would generate itself or purchase from another source." [5]
- A requirement that each public utility and specified municipal utilities continuously offer a purchase contract to producers of renewable energy, with the purchase price set at the purchasing utility's full avoided costs.[6]
- A requirement that the Florida Public Service Commission (PSC) adopt rules to establish a renewable portfolio standard that will require each public utility to produce or procure renewable energy in a minimum amount expressed as a percentage of the utility's total retail sales, with the rules subject to legislative review and not to be implemented until after legislative ratification.[7]
- State-funded matching grants to be awarded under the Renewable Energy and Energy-Efficient Technologies Grants Program for demonstration, commercialization, research, and development projects

[1] The term "electric utility" includes any municipal electric utility, investor-owned electric utility, or rural electric cooperative which owns, maintains, or operates an electric generation, transmission, or distribution system within the state. s. 366.02(2), F.S.

[2] A cogenerator is a facility sequentially producing both thermal energy and electrical or mechanical power from the same fuel source. For example, a manufacturing plant that produces heat as a part of the manufacturing process then uses that heat to produce steam to make electricity. PSC's *Florida's Electric Utilities: A Reference Guide*, 1994 edition, page 30.

[3] A small power producer generates electricity using biomass, solid waste, geothermal energy, or renewable resources (wind, solar, small hydroelectric) as their primary energy sources. PSC's *Florida's Electric Utilities: A Reference Guide*, 1994 edition, page 188.

[4] The definition of the term "public utility" specifically excludes cooperative and municipal electric utilities, leaving only the investor-owned utilities. s. 366.02(1), F.S.

[5] s. 366.051, F.S.

[6] s. 366.91, F.S.

[7] s. 366.92(3), F.S. The PSC conducted rulemaking proceedings and filed a report with the Legislature, but did not actually adopt any RPS rules. Draft Renewable Portfolio Standard Rule: Submitted to the President of the Senate and the Speaker of the House of Representatives to Fulfill the Requirements of Section 366.92(3), Florida Statutes, Florida Public Service Commission, January 30, 2009. During the 2009 Regular Session, Senator Jim King sponsored a bill, SB 1154, to enact an RPS that expanded upon the recommendations in this report. The bill passed the Senate but died in the House of Representatives.

relating to renewable energy technologies and innovative technologies that significantly increase energy efficiency for vehicles and commercial buildings.[8]

- State-funded rebates available under the Solar Energy System Incentives to provide financial incentives for the purchase and installation of solar energy systems, with the program to expire June 30, 2010.[9]
- State-funded rebates for a purchase of an energy-efficient appliance under a rebate program to be developed by the Florida Energy and Climate Commission.[10]
- An exemption from the sales tax for materials incorporated into hydrogen-powered vehicles and for hydrogen-fueling stations, up to $2 million in tax each fiscal year; for commercial stationary hydrogen fuel cells, up to $1 million in tax each fiscal year; and for materials used in the distribution of biodiesel and ethanol, including fueling infrastructure, transportation, and storage, and including the costs of retrofitting a gasoline fueling station pump for ethanol distribution, up to $1 million in tax each fiscal year. This exemption is repealed July 1, 2010.[11]
- An investment tax credit against the corporate income tax for up to 75 percent of capital costs, operation and maintenance costs, and research and development costs incurred: up to a limit of $3 million per state fiscal year for all taxpayers in connection with an investment in hydrogen-powered vehicles and hydrogen vehicle fueling stations in the state; up to a limit of $1.5 million per state fiscal year for all taxpayers, and limited to a maximum of $12,000 per fuel cell, in connection with an investment in commercial stationary hydrogen fuel cells in the state; and up to a limit of $6.5 million per state fiscal year for all taxpayers, in connection with an investment in the production, storage, and distribution of biodiesel (B10-B100) and ethanol (E10-E100) in the state. This exemption is repealed July 1, 2010.[12]
- A requirement that the Department of Environmental Protection adopt rules for a cap-and-trade regulatory program to reduce greenhouse gas emissions from major emitters (defined as electric utilities), with the rules not to be adopted until after January 1, 2010, and not to become effective until ratified by the Legislature.[13]
- Creation of the Florida Energy Systems consortium to promote collaboration among experts in the State University System for the purposes of sharing energy-related expertise and assisting in the development and implementation of a comprehensive, long-term, environmentally compatible, sustainable, and efficient energy strategic plan for the state, focusing on the research and development of innovative energy systems that will lead to alternative energy strategies, improved energy efficiencies, and expanded economic development for the state.[14]
- A requirement that, beginning December 31, 2010, all gasoline sold or offered for sale in Florida must be blended gasoline, which is defined as a mixture of 90 to 91 percent gasoline and 9 to 10 percent fuel ethanol, by volume, with the fuel ethanol portion to be derived from any agricultural source.[15]

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[8] s. 377.804, F.S. The grants are available for renewable energy on both renewable electric energy and renewable motor vehicle fuels.

[9] s. 377.806, F.S. The rebate is available for a new photovoltaic system of 2 kilowatts or larger, with the amount of the rebate to be $4 per watt based on the total wattage rating of the system, with a maximum allowable rebate per solar photovoltaic system installation of twenty thousand dollars for a residence or one hundred thousand dollars for a place of business, a publicly owned or operated facility, or a facility owned or operated by a private, not-for-profit organization, including condominiums or apartment buildings. The rebate is available for a solar thermal system that provides at least 50 percent of a building's hot water consumption for a solar thermal system or for a solar thermal pool heater, with the amount of the rebate to be five hundred dollars for a residence, fifteen dollars per 1,000 Btu up to a maximum of $5,000 for a place of business, a publicly owned or operated facility, or a facility owned or operated by a private, not-for-profit organization, including condominiums or apartment buildings, and $100 per installation for solar thermal pool heaters.

[10] s. 377.807, F.S. The Commission is in the process of developing rules to establish this program.

[11] s. 212.08, F.S.

[12] s. 220.192, F.S.

[13] s. 403.44(5), F.S. To comply with a cap-and-trade rule, a utility might be forced to utilize more renewable energy.

[14] s. 1004.648, F.S

[15] s. 526.203, F.S.

Discussion

A. Preliminary Issues

There are several issues that must be addressed before considering subsidies or economic incentives.

The first issue is the question of what is the underlying public policy for encouraging increased use of renewable energy. It is impossible to determine what incentives will best obtain a desired result without first identifying the goal to be achieved by that result. The purposes or goals most often referred to in existing renewable energy statutes are fuel security, the environment (with a recent emphasis on climate change), and economic development. The first two seem to be primary concerns, with economic development secondary. The first two concerns and the potential remedies for each are often in conflict. For example, increased use of any fossil fuel other than natural gas would diversify fuels[16] and help avoid natural gas supply and price issues, but would increase carbon dioxide emissions in conflict with climate change goals. The two can be pursued simultaneously, but the potential for conflict must be recognized and taken into consideration.

Once the broad underlying policy goal is identified, the more-specific goals, priorities, methods, and plans to reach that goal must also be identified in some detail. A key consideration in establishing those priorities is the timing of anticipated costs and benefits. Given limited funding, should those funds be focused on present or future costs and benefits? Some resources, for example biomass, produce more energy more quickly and less expensively than others, such as solar photovoltaic, yet the latter resources may have greater future potential.[17]

Upon identifying underlying policy goals, the next issue is the question of what types of fuels and technologies should be included in the term "renewable energy" and thereby included in any incentive program. A broad interpretation would include any fuel that can be replenished.[18] More narrow interpretations limit the fuel or technology included within the term's definition based on anticipated environmental impacts, either in use of the fuel or technology or as a tangent to its use, bringing in concepts and terms like "green" or "clean" with their own ambiguities and uncertainties. For example wind is generally considered to be a renewable energy resource to produce electricity, but may not be acceptable to some as the wind turbines can kill birds. Similarly, corn-based ethanol is generally considered a renewable motor vehicle fuel but may not be acceptable due to its impacts on land use, water supply, water pollution, and limitations on food supply. On the other hand, nuclear energy, which produces no emissions, is unacceptable to many people due to the issue of waste disposal.[19]

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[16] Diversification of fuel types to meet Florida's growing dependency on natural gas for electric production is one of the potential benefits of renewable energy set forth in section 366.91(1), F.S.

[17] This is neither a new issue nor one limited to renewable energy resources. With conventional fuels and technologies, similar choices must be made as between a power plant that is less expensive up-front but may have higher costs later, like a natural gas combined cycle plant, and one that is more expensive up-front, but may have lower costs later, like a nuclear plant. Permitting and constructing of the natural gas plant costs significantly less and is much quicker so the near-term benefits are greater. In contrast, permitting and constructing the nuclear plant is costly and time-consuming, but the fuel is much less expensive and, historically, much less subject to price fluctuations.

[18] This does, however, raise other issues such as whether the renewal must be natural or can involve human activities and whether there are any limitations on the renewal, for example as to time or location.

[19] There are potential disposal sites for nuclear waste other than Yucca Mountain. While helium sources are widespread, helium gas fields are very limited. The reason is that helium atoms are tiny and don't form ordinary chemical bonds, so it leaks out of most potential containers. Helium is retained in natural gas traps, and all commercial helium is a by-product of natural gas production. Almost invariably, natural gas fields with recoverable helium have anhydrite or salt cap rocks. The military's radioactive waste disposal site is located in a salt bed; helium leak-tested for geologic time. But the proposed Yucca Mountain site has neither anhydrite nor salt. Hubbert's Peak: The Impending World Oil Shortage, Kenneth S. Deffeyes, Princeton University, Princeton, NJ, 2001, pages 66-67.
Such fields may also be potential sites for carbon dioxide sequestration.

In determining what energy resources to use to achieve the underlying policy goal, consideration should be given to using tools such as conservation and efficiency programs and use of non-renewable energy resources, both of which could help achieve goals relating to both fuel and carbon emissions.[20]

After determining the underlying policy goal and the resources to use to achieve it, the next set of issues relate to the increased costs of renewable energy. The electricity produced by use of renewable energy is identical to that produced by traditional means. Any additional value is due to its effects in achieving the benefits of the underlying policy goals, the enhanced fuel security or reduced carbon dioxide emissions. These benefits can be very difficult to identify with specificity and to quantify. The cost-related policy issues include:

- how the additional value will be quantified;
- who will pay the additional cost;
- how will it be assessed and collected;
- who the subsidies will be paid to, the utility, a non-utility energy provider, or the purchaser of renewable energy production technology or energy efficiency and conservation products;
- whether the subsidies will be awarded on either a competitive basis or using some form of government-established criteria, or some combination of the two; and
- whether the selection process will address the issue of prioritization between present and future benefits?

There are also legal issues involved in these policy issues, including how the increased costs of renewable energy will be reconciled with:

- the statutory requirement of fair, just, and reasonable rates,[21]
- the statutory statement of legislative intent to promote the development of renewable energy "and, at the same time, minimize the costs of power supply to electric utilities and their customers,"[22]
- the statutory requirement of payment for renewable energy at the purchasing utility's full avoided costs,[23] and
- the terms of existing purchase contracts entered into pursuant to these statutes.

The next set of issues involves potential detrimental impacts on the current systems of electricity production and delivery and of regulation of these activities. With vertically-integrated utilities subject to economic regulation, it is easier to ensure a sufficient, adequate, and efficient supply[24] of electricity at fair and reasonable prices. As other entities begin to produce significant percentages of the electricity supply, this process becomes more difficult.[25]

In considering these issues, the Legislature should consider that the prices for both electricity and motor vehicle fuels are likely to increase no matter what action it takes, due to increasing global demand for fuels and for construction materials. In addition, there is no single cure-all remedy available that will address either the fuel or climate change problems. Finally, the Legislature may want to keep in mind the following lesson, which applies to policymaking as well as economics.

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[20] One example of non-renewable energy resources that could help meet underlying goals is use of coal plants using integrated gasification combined cycle technology coupled with carbon dioxide capture and sequestration.

[21] ss. 366.041(1) and 366.06(1), F.S.

[22] s. 366.92(1), F.S.

[23] ss. 366.051 and 366.91, F.S.

[24] s. 366.03, F.S.

[25] One of the most significant issues is how to ensure the continuation of an adequate supply without excessive cost. The regulated utilities have an obligation to serve, which includes a requirement that they continually provide an adequate and reliable supply of electricity to meet the demand of all customers. Renewable energy suppliers have no such obligation. This could become an issue in two situations. The first is where the amount of energy supplied by entities other than regulated utilities becomes significant, such as perhaps the 20 percent sought by RPS proposals. The second is if renewable energy producers were to be allowed to make retail sales directly to end user customers. Under either circumstance the adequate supply of electricity for some customers is at potential risk in the first situation if some relatively large portion of this energy becomes unavailable and in the second if the renewable energy producer ceases to provide the electricity needs of customers. In either circumstance, either the utility would have to have redundant electricity generation capacity otherwise sitting idle to bring into production or there would be power outages. There are costs and consequences either way, and any new policy should take these possibilities into consideration.

"The art of economics consists in looking not merely at the immediate but at the longer effects of any act or policy, it consists in tracing the consequences of that policy not merely for one group, but for all groups."[26]

B. Potential incentives

There are five potential methods of providing an economic incentive;

- maintain current incentives;
- create a renewable portfolio standard requirement;
- create a feed-in tariff requirement;
- create a public benefits fund; and
- provide for limited retail sales by renewable energy producers.

1. Maintain current incentives

The more utilized of the currently available incentives are the Renewable Energy and Energy-Efficient Technologies Grants Program and the Solar Energy System Incentives rebate program, both of which expire June 30, 2010. These programs are administered by the Florida Energy and Climate Commission (FECC).

The following information on the grant program is taken verbatim from the FECC's website.[27]

In February 2007, the following eight projects were awarded grants totaling $15 million.

- Citrus Energy LLC, "Fuel Ethanol Production from Citrus Waste Biomass" ($2.5 million) - Based in Clewiston, the company will construct a four million gallons per year ethanol bio-refinery to use citrus waste to produce ethanol.
- Alico, Inc., "Commercial Ethanol Production from Biomass" ($2.5 million) - The project will use biomass products to co-produce ethanol and electricity at a savings for consumers.
- University of Florida, "Renewable Energy Fuels in a Micro - Grid Power Module" ($2,464,703) - The grant will be used to construct a small-scale demonstration plant using the University's patented PoWER technology, including operation on a variety of liquid and gaseous biofuels. The system allows ultra-clean, efficient operation on a wide variety of biomass fuels.
- Florida Solar Energy Research and Education Foundation, "Getting Down to Business: Transforming Florida's Solar Marketplace" ($1,921,575) - By demonstrating the use of appropriate solar technologies in the commercial sector, the statewide initiative is designed to increase the use of solar technologies as well as strengthen and stabilize the solar energy industry in Florida.
- Orange County Government, "Photovoltaic Demonstration and Research Facility and Climate Change Education Center" ($1,802,567) - This project enables the completion of a demonstration, research and education program through the installation of the largest solar photovoltaic (PV) system in the South, a one megawatt solar PV system located at the Orange County Convention Center.
- Florida International University, "Assessment and Development of Pretreatment for Sugarcane Bagasse to Commercialize Cellulosic Ethanol Technology" ($990,532) - The university project will determine the technical feasibility of using Florida sugarcane waste as a feedstock for a large-scale ethanol industry in the state.
- Florida Biomass Energy Consortium, "Using High Efficiency Biomass Gasification for Industrial Drying" ($2.5 million) - The proposal is to build and operate an integrated biomass gasification system to replace natural gas use with biogas for an industrial user.
- ALLSOLAR Service Company, "Villa Sol: Florida's Solar Community" ($320,623) - The objective of the project is to expand on an existing solar community and publicize its success, encouraging others to replicate this development throughout Florida.

In February 2008, the following eight projects were awarded grants totaling $12.5 million.

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[26] Economics in One Lesson, Henry Hazlitt, Laissez Faire Books, San Francisco, California, 1946, page 5.

[27] http://myfloridaclimate.com/climate_quick_links/florida_energy_climate_commission/grants_solar_rebates_incentives

- Central Florida Regional Transit Authority (LYNX), "Go Renewable Energy Efficient Next-Generation Biodiesel Fleets" ($2.5 million) - Located in Central Florida, this partnership will implement a large-scale alternative fuel research and demonstration project that provides biodiesel blending at a central fueling location. By 2010, Orange County, LYNX and Orlando Utilities Commission will have transitioned their entire diesel fleet to biodiesel blended fuel.
- Exceed Corporation, "Dollars & Sense: Renewable Energy for Florida Builders & Developers" ($990,000) - This project, located in Pinellas County, will develop a profitable model for replication that will provide solutions to up-front cost barriers for renewable energy investments for Florida developers.
- Florida Power and Light, "St. Lucie Wind" ($2.5 million) - This project will construct the first wind energy facility in Florida. As proposed, up to nine wind turbine generation units would be placed in St. Lucie County and with the potential capacity of 20 megawatts of electrical power.
- Marc Rutenberg Homes, Inc., "Production Quality Zero Energy Homes" ($2,166,104) - The recipient, a Florida home builder, will create production-quality Zero Energy Homes, ready for mass market in Florida. Zero Energy Homes are not currently available to Florida consumers; this project will create an integrated and systematic approach that can be easily duplicated.
- Orange County Government, "Photovoltaic Demonstration and Research Facility and Climate Change Education Center" ($697,433) - A continuation of a previous grant, this project enables the completion of a demonstration, research and education program through the installation of the largest solar photovoltaic (PV) system in the South, a one megawatt solar PV system located at the Orange County Convention Center.
- Progress Energy Florida, "Small-Scale Wind Power in Florida" ($123,868) - This project will evaluate inland opportunities for wind energy generation in Florida by using five wind turbines at five different locations across the state, providing more than 15,000 kilowatt hours of wind generation annually.
- Solarsa International Ltd. Co., "Solar Cooling Manufacturing Plant" ($1,022,595) - With this grant, the recipient will create a manufacturing, assembly and quality control facility to mass produce and distribute solar thermal collectors, concentrating solar collectors, chillers and pre-packaged Solar Cooling Systems that utilize thermal energy to provide heating, cooling and hot water.
- Vecenergy, "Production of Biodiesel Using Multiple Feedstocks" ($2.5 million) - Located in Manatee County, the project includes construction and operation of a biodiesel facility capable of producing 37.5 million gallons of biodiesel per year.

In 2009, the following nine projects were awarded grants totaling $15 million.

- Willard & Kelsey Solar Group, LLC, "Willard & Kelsey Solar Group International Solar Park Manufacturing and Administrative Headquarters" ($2.5 million) - This project will create a manufacturing and administrative headquarters for to produce solar photovoltaic panels. Utilizing new technology, the company creates a more efficient solar panel that can generate electricity in all spectrums of light – meaning a more productive solar panel that generates power even on cloudy days.
- University of South Florida, "Smart Grid with Renewable Strategic Load Pocket" ($1,422,364) - This project will implement a "Smart Grid" on a portion of Progress Energy Florida's distribution system in St. Petersburg, Florida. The system will integrate the use of renewable distributed generation along with advanced sensors, communication and control technologies, and other technologies, along with two-way communication between the utility and electric loads within customer premises, to increase energy efficiency, reliability and security.
- ARI Green Energy, Inc., "Next Generation Small Wind Generator Systems Manufacturing Site" ($2.5 million) - The grant recipient manufactures hybrid wind and solar renewable energy systems for light industrial and residential applications worldwide. This project would establish a facility to manufacture and warehouse a new generation of wind and solar renewable energy systems on a 45-acre site in the Hamilton County Enterprise Zone.
- Mustang Vacuum Systems, LLC, "Solar Energy Project" ($577,636; partial funding) - This project will allow Mustang Vacuum Systems, a Florida company, to expand its thin-film solar photovoltaic cell production. With the goal of reducing solar energy costs, the company has designed and built three types of machines to meet the particular needs and specifications of solar cell manufacturers. Customers are now looking for larger, higher volume machines, which will provide greater performance and output.

- Southeast Renewable Fuels, "Construction of Sweet Sorghum to Ethanol Advanced Biorefinery" ($2.5 million) - The recipient will build a 20 million gallons per year, sweet sorghum-to ethanol advanced bio-refinery in Hendry County, with a business plan to expand to 100 million gallons per year capacity over a 5-7 year period. The recipient will use locally-grown sweet sorghum as its feedstock, and will also use steam produced from combusting the sweet sorghum bagasse to produce the steam and electricity required to operate the facility.
- Verenium Biofuels Corp., "Highlands Ethanol Project" ($2.5 million) - The recipient will construct Florida's first commercial cellulosic ethanol production facility plant that will produce 36 million gallons of ethanol per a year. The project will incorporate the entire process required for ethanol production, from feedstock pretreatment through hydrolysis and fermentation to the distillation of the fuel-grade ethanol. The feedstock supply will consist of high fiber perennial and annual non-food crops, using primarily a lowcontent sugar cane with sorghum as a supplemental crop.
- Highlands EnviroFuels, LLC, "No-Tillage Sweet Sorghum Cropping System to Reduce Green House Gases for Biofuel Production" ($305,000) - The recipient will own and operate a 20 million gallon per year, sugar-to ethanol plant, based upon a conventional Brazilian-style sugar cane-to-ethanol plant but optimized to use both sweet sorghum and sugar cane as the primary feedstocks. The plant will require up to 20,000 acres of local sweet sorghum production.
- Florida Thoroughbred Breeders & Owners Association, "Ocala Equine Energy" ($2.5 million) - The recipient will utilize horse manure to generate renewable energy, primarily electric and thermal energy. The project will design, build and operate a renewable energy facility, using grant funding to help purchase waste handling and processing equipment.
- Florida Crystals Corporation and Coskata, Inc., "Engineering for Commercial Scale Biomass to Liquid Fuels Plant and Eucalyptus Energy Plantation" ($195,000; partial funding) - The recipient will develop a dedicated energy crop plantation for use as a biomass fuel source for either renewable electricity generation or biofuel production. The project will plant Eucalyptus grandis on 655 acres, which is expected to yield approximately 21,000 green tons per year or 63,000 green tons over three years, representing a total of about 31,000 tons of biomass.

Concerns have been raised about the grant program. One concern is whether it is providing benefits congruous with the costs.[28] A second is the lack of accountability for an entity consisting of people who were appointed, not elected, and who are awarding millions of dollars in state funds.[29]

The other heavily-utilized incentive program is the solar system rebate program. This program had a backlog of approved solar rebate applications in excess of $5 million. Federal stimulus money has since provided funding both for this backlog and additional rebates.

2. Renewable Portfolio Standard

A renewable portfolio standard (RPS) is a law requiring that each utility produce or purchase a specified percentage of that utility's total retail sales of electricity from renewable energy resources, as that term is defined in the law. The goal of an RPS is to stimulate market and technology development so that, ultimately, renewable energy will be economically competitive with conventional forms of electric power.[30]

As was set out above, Florida currently has two purchase-requirement statutes.[31] The primary focus of these statutes, however, is not on the amount of renewable energy to be purchased but rather the purchase price for the renewable energy. These statutes require each utility to purchase all of the renewable energy that producers can sell them at the purchasing utility's full avoided costs. In contrast, an RPS requirement would create a minimum level of demand for renewable energy and either establish a price premium for that energy or leave the price to be established by competition among prospective suppliers to meet the mandated demand.

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[28] The FECC has no information on the status or results of the programs for which grants were awarded.
[29] The Florida Energy and Climate Commission is created by s. 377.6015, Florida Statutes. It consists of nine members, with seven appointed by the Governor, one by the Commissioner of Agriculture, and one by the Chief Financial Officer.
[30] See, e.g., http://www.epa.gov/chp/state-policy/renewable_fs.html.
[31] ss. 366.051 and 366.91, F.S.

According to the U.S. Department of Energy, 24 states have an RPS.[32] These laws vary tremendously as to what types of utilities are subject to the requirement, what types of fuels and technologies are included,[33] what amount or percentage of renewable energy is required, whether any fuels or technologies are given preference in terms of either the amount to be purchased or the price to be paid, whether all or a portion of the renewable energy must be produced in the state, and how quickly the renewable energy must be produced.

The approach proposed in the PSC report and SB 1154 was that the utility would continue to buy the electricity from renewable energy producers for full avoided costs, and would satisfy the RPS by purchase of renewable energy credits (REC), a certificate representing the additional value to society of using the renewable energy resource.[34] In its final form, the Senate Bill created the following three classes of clean energy.

- Class I included wind and solar photovoltaic systems.
- Class II included all clean energy other than class I or class III.[35]
- Class III included nuclear energy placed in commercial service after July 1, 2009, any fossil fuel generation for which carbon capture and sequestration plans have been approved by the Department of Environmental Protection, and energy produced through use of pipeline-quality synthetic gas produced by processing waste petroleum coke with carbon capture and sequestration plans approved by the state or federal authority having jurisdiction.

The requirement applied only to investor-owned utilities maintaining generation and transmission facilities in Florida. These utilities were required to meet or exceed a schedule for renewable energy production that started at seven percent by January 1, 2013 and ended at 20 percent by January 1, 2021. No more than 25 percent of the amount of each year's requirement could be from Class III energy. If a utility failed to meet the requirement for any reason other than an inadequate supply or a cost of compliance in excess of two percent of the investor-owned utility's total annual revenues from retail sales, the utility would be subject to a penalty for each day of noncompliance. Costs of compliance included costs associated with the purchase of clean energy credits, costs associated with the clean energy credit market, and costs paid by a utility to produce clean energy itself which were in excess of costs of conventional methods of generation. The costs of compliance were to be allocated evenly among Class I and Class II resources.

The PSC was required to file a report by February 1 of 2010 and each year thereafter that detailed developments in the production of clean energy, how much and what types of clean energy are available in various regions of the state and at what cost, and any impediments to further increases in the production of clean energy in this state. It is likely that the PSC's development of the information for the initial report and the utilities' initial planning would take place simultaneously as the initial goal for each process would be to identify and quantify potential resources and costs. As such, if any significant problems were identified in either process with either supply or cost, the PSC report would have noted this and the Legislature could have reacted in time to avoid harmful cost impacts to the utilities' ratepayers.

One complaint that was raised about the RPS approach was that government was picking winners and losers by singling out specified types of renewable energy that would be included and excluded, and that would receive higher or lower incentives. This is not necessarily bad; the difference in treatment is typically based on the issue

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[32] http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm

[33] Some include conservation and efficiency methods and one, Ohio, includes "alternative energy resources" which includes third-generation nuclear power plants and clean coal technology that can control or prevent carbon dioxide emissions. http://www.legislature.state.oh.us/bills.cfm?ID=127_SB_221

[34] Typically, a renewable energy producer is considered to produce two products, the electricity and a separate renewable energy credit or "REC." The REC represents the societal benefit received from using a renewable energy fuel or technology as opposed to conventional fuels and methods. The REC typically represents one megawatt hour (MWh) of renewable energy that is sold onto the grid. The two products may be sold together or separately, depending on the law and the sales contract.

[35] Class II included which included hydrogen produced from sources other than fossil fuels, biomass, solar photovoltaic, geothermal energy, wind energy, ocean energy, hydroelectric power, waste heat from sulfuric acid manufacturing operations; waste heat thermal energy which is produced by a combined heat and power system placed in service in this state after July 1, 2009, and which is used to produce biofuel and any associated coproducts; and energy produced using biodiesel

discussed above as to prioritizing between fuels and technologies that produce better results and those that have better future promise. Additionally, any law that does not make these distinctions also picks winners and losers, albeit indirectly. Without additional subsidies in the earlier years of subsidy programs, those technologies that cannot economically compete are losers, and there likely will be no development of these technologies, no decrease in their costs, and no benefits of their use.

Also, it is possible to use a combination of government predetermination and market competition. For example, the RPS law could provide that a specific amount of purchases and subsidies musts go to specified types of renewable energy, but leave the choices of actual providers to a competitive selection method instead of a predetermined purchase price, which introduces competition and the potential to more quickly drive down prices.

Another complaint about the RPS approach is that the utilities' ratepayers pay all of the additional costs, and most of them receive no direct benefit, only the indirect benefits of the underlying policy goal, the better fuel security, lower carbon emissions, or other benefit. Only those who can afford to install a renewable energy system on their property get the direct benefit of reduced utility bills and an income stream, which gives rise to the complaint that the poorer ratepayers are subsidizing the wealthier ones.

The ultimate costs and benefits of an RPS depend on the particular types of fuels and technologies used, any prioritization among current and future benefits, the amount of renewable energy produced, and the amount of cost to ratepayers. If the RPS is limited to resources within the state, the results depend to a very large extent on the amount of renewable energy resources available in Florida. Estimates of both current resources and future potential resources vary considerably. Current renewable energy production is likely about two percent of total retail sales. While future potential depends to a large extent on how much the producers would be paid, there are real-world limitations. For example, solar is not available at night, on cloudy days, or in shady locations, wind is unavailable in most of the state, and biomass is limited both by its low energy content and the expense of transportation. If, on the other hand, the RPS is expanded to include resources outside the state, the benefits to the state and its citizens are diluted.

3. Feed-in Tariff

A feed-in tariff (FIT) is a law requiring that retail utilities purchase electricity produced by specified types of technologies at specified prices for a specified period of time, with different prices usually set for different technologies. The utility passes the extra cost on to its ratepayers.

Germany is frequently used as an example of a feed-in tariff program. Its program includes biomass; wind; geothermal; landfill gas, sewage gas, and mine gas; hydropower; and solar photovoltaic and solar thermal. [36] The price depends on the type of technology used and the year in which energy production was begun, as the rate is scheduled to decrease annually at one to five percent depending on technology. [37] The total length of time for the tariff is 20 years with payments fixed for the 20–year period.[38] The tariff price for solar photovoltaic is about four times the retail price for conventional electricity.[39] Despite this high purchase price per kilowatt hour, photovoltaic-produced energy in Germany is still below 1 percent of the total energy production so the average household utility bill has increased less than $1 a month as a result of the additional cost of the feed-in law.[40]

The FIT approach appears to have two primary advantages. The first is the mandatory high purchase price and the fact that it is locked in for 20 years, which establishes a certain revenue stream which helps in obtaining

[36] See, e.g., http://www.energy.ca.gov/2007_energypolicy/documents/2006-08-22_workshop/presentations/4-FEED-IN_TARIFFS-K-PORTER.PDF
[37] See, e.g., http://www.energy.ca.gov/2007_energypolicy/documents/2006-08-22_workshop/presentations/4-FEED-IN_TARIFFS-K-PORTER.PDF
[38] See, e.g., http://www.energy.ca.gov/2007_energypolicy/documents/2006-08-22_workshop/presentations/4-FEED-IN_TARIFFS-K-PORTER.PDF
[39] See, e.g., http://www.guardian.co.uk/business/2007/jul/23/germany.greenbusiness
[40] See, e.g., http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/08/29/EDDGRQG08.DTL

financing. The second is the lack of red tape that is involved in programs such as a subsidy program or REC market.[41]

The only FIT in America now is in the City of Gainesville, which adopted a feed-in tariff ordinance on February 5, 2009, to take effect on March 1, 2009.[42] Their tariff rate is 32 cents per kilowatt hour, with a maximum of 4 megawatts of solar panel installation a year in the feed-in tariff program. The ordinance includes a reduction in the amount paid per kilowatt hour beginning in the third year, which takes into account the expectation that the cost of the technology should decrease over time.[43] It is estimated that the feed-in tariff ordinance will increase homeowners' electricity bills by 74 cents a month. Opponents of FITs argue that they disproportionally impact poor people because a relatively high percentage of their income goes to pay utility bills.[44]

Solar programs have sometimes been so popular that costs can spiral out of control. Last fall, growth forced Spain to cap the number of solar installations it would subsidize. Ontario, which has had a FIT since 2006, also suspended its program last year after being oversubscribed. In Gainesville, a few days after the ordinance was adopted, the city reached its cap on solar payments for this year and next.[45]

Costs and benefits again depend on the particular types of technologies that can qualify for the FIT price, any preference among these technologies, the amount of renewable energy produced, and the amount of cost to ratepayers.

4. Public benefits fund

Public benefits funds have been used in other states as part of a renewable energy incentive program. The public benefits fund simply establishes a dedicated funding mechanism, using taxes or fees as revenue; the actual incentive mechanisms used aren't necessarily different from those already discussed.

There is a potential alternative use for the funds. The Florida Energy Office is using $22 million in federal stimulus money to create, in essence, a state venture capital fund called the Florida Clean Technology Opportunity Fund. They will contract with an investment firm that will add money from private and institutional investors to leverage the state's investment. All investments will be in energy-related projects in Florida, which is expected to bring renewable energy and energy efficiency companies into Florida. The state's share of profits will come off the top. It is expected that the fund will become self-replenishing as profits are realized.

This could be a model for a state fund, with funding from General Revenue, offshore drilling revenues (should the state choose to allow drilling), a fee on motor vehicle fuels, or a fee on electricity.

The RPS and FIT approaches create a demand for renewable energy. This approach is more of a supply-side, top-down approach, building industry to establish a better, more competitive supply of renewable energy and efficiency products and thereby increase demand. It has a more direct, greater emphasis on economic development.

5. Limited retail sales

A final alternative would be to allow an electricity customer to contract with a provider of renewable energy to directly sell electricity to a customer at retail. Under current law, only a regulated utility, a municipal utility, or a cooperative utility can sell electricity at retail. A person or business can produce its own electricity, but cannot contract with a non-utility to do so; the person or business must own and operate the production facilities.[46] There

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[41] See, e.g., http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2007/08/29/EDDGRQG08.DTL

[42] http://www.gru.com/Pdf/AboutGRU/News/FIT/2009%20FIT%20Ordinance%20CLEAN.pdf

[43] http://www.gainesville.com/article/20090206/ARTICLES/902061014?Title=Commission-gives-its-approval-to-feed-in-tariff-for-solar-power

[44] http://www.nytimes.com/2009/03/13/business/energy-environment/13solar.html

[45] http://www.nytimes.com/2009/03/13/business/energy-environment/13solar.html

[46] Chapter 366, F.S., requires that each "electric utility" comply with its requirements, and defines that term to include every person or entity supplying electricity to the public. s. 366.02, F.S. The Florida Supreme Court has interpreted this to mean

has been interest in recent years in allowing an entity such as a business or a homeowners' association to contract with a renewable energy producer to supply the entity's electricity. The entity wants an alternative to the utility, but doesn't want to get into the power-generation process itself.

This would have to be done on a very strict basis to avoid detrimental impacts to the particular utility's other ratepayers, using restrictions such as those listed below.

- The retail relationship between the renewable energy producer and customer would be governed solely by the purchase contract, with any disputes going to the courts for resolution.
- If the customer or renewable energy producer wants to receive any services from the utility, the customer or producer must negotiate a contract with the utility for those services.
- The customer or producer must pay the utility a reasonable price for all services, including:
    - standby power (so the customer or producer pays for redundant capacity, not the utility's ratepayers);
    - electricity provided when the renewable energy facility is not producing, at rate specified in contract based on new usage projections;
    - interconnection and metering; and,
    - a reasonable wheeling fee if any transmission is required or requested.
- There will be no preference or discrimination relating to restoration of service due to a utility power plant or power line outage.
- The utility is not responsible for any services outside the terms of its contract with the customer or renewable energy producer.
- Both the utility providing ancillary services and the purchaser of those services must negotiate in good faith to enter into a fair, reasonable, and nondiscriminatory contract, and either party may petition the PSC for resolution of any disputes. For consistency and long-term efficiency, it might be best if the PSC established guidelines as to these types of contracts.[47]
- If the renewable energy producer ceases to provide electricity to the customer, the utility serving that territory has no obligation to the customer beyond that owed to a new customer and does not have to assume operation of any power production or distribution facilities previously operated by the renewable energy producer.

This approach is voluntary, so no one has to purchase anything or pay a share of a project that they receive no direct benefit from. Economics determine which renewable energy producers can sell and at what price. It is likely that the customers that choose this option will be among the utility's highest-use customers, their best customers for revenue purposes.

The renewable energy producer could sell any excess onto the grid at full avoided costs, and likely could create and sell renewable energy credits into the national REC marketplace as additional inducement.

This may be attractive to some businesses. For example, Publix already has four installations under the self-generation option. These installations are a GreenWise Market in Palm Beach Gardens, a GreenWise Market in Boca Raton, a Publix in Miami Lakes, and their corporate office in Lakeland.[48]

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that a non-utility can produce electricity for its own use, but cannot sell any excess at retail to any other person or entity. *PW Ventures, Inc. v. Nichols*, 533 So. 2d 281 (Fla. 1988).
Additionally, to build a power plant with a capacity of 75 megawatts or more requires a determination of need. s. 403.506, F.S. To petition for a determination of need, the proposed power plant owner must be a regulated investor-owned utility, a municipal electric utility, or a cooperative electric utility serving retail customers. s. 403.519, F.S., *Tampa Electric Co. v. Garcia*, 767 So. 2d 428 (Fla. 2000), and *Panda Energy International v. Jacobs*, 813 So.2d 46 (Fla. 2002).

[47] There is a similar current relating to purchases of energy for full avoided costs under s. 366.051, F.S., where the PSC is directed to establish guidelines for the purchase contracts.

[48] http://sustainability.publix.com/what_we_are_doing/energy.solar_energy.php