



# **Energy Efficiency and Renewable Energy in Florida Executive Summary**

For the Florida Energy and Climate Commission

By:

Dr. Julie Harrington, Director

Dr. Bassam Awad

Zafar Siddiqui

Stephen Muscarella

Center for Economic Forecasting and Analysis (CEFA)

Florida State University

Ted Kury, Director, Energy Studies

Achala Acharya

The UF Public Utility Research Center (PURC)

University of Florida

Erik Sander, Associate Director

Florida Energy Systems Consortium (FESC)

Jack Sullivan Jr., President / CEO, Florida Research Consortium (FRC)

Dr. Aster R. Adams

March 12, 2010

Energy supply and production is of critical importance for Floridians. Florida, and the nation, in general, are concerned with the status of current energy reserves; based primarily on non-renewable resources. The diversification of the nation's energy portfolio to include renewable resources helps improve: 1) energy reliability and independence from foreign production 2) greenhouse gas emissions and/or global warming 3) national security and; 4) long term energy price stability. In addition to clean and renewable energy, the other area of interest in this study is energy efficiency.

This study aims to provide a framework or roadmap for the transition to clean and renewable energy sources, and energy efficiencies, in line with market driven forces. We conduct a comprehensive review of almost all existing statutory incentives supporting the deployment of energy efficiency and renewable energy in Florida followed by a discussion of effective mechanisms to overcome barriers of commercialization and project finance, and finally, with an analysis of the economic impact of a state renewable portfolio standard. In conclusion, this project aims to provide a necessary foundation or baseline for the next step in renewable energy and energy efficiency strategic planning and implementation, along with some suggestions and recommendations.

### ***Current Incentive Mix***

Government incentives (both State and Federal) can be categorized into two basic categories; up front incentives and performance based incentives. This section will look at current Florida renewable energy incentives.

The renewable energy incentives in Florida encompass:

- Renewable Energy Production Tax - Florida Statutes §220.193
- Renewable Energy Technologies Investment Tax Credit - Florida Statutes §220.192
- Renewable Energy Equipment Sales Tax Exemption - Florida Statutes §212.08(7)(ccc)
- Renewable Energy Technologies Grants Program - Florida Statutes §377.804
- Solar Energy System Incentives Program (Solar Rebate) - Florida Statutes §377.806
- The Capital Investment Tax Credit - Florida Statutes §220.191
- Renewable Energy Property Tax - Florida Statutes §196.175
- Solar Energy Systems Equipment Sales Tax Exemption - Florida Statutes §212.08(7)(hh)

Of these eight programs, the following five programs are scheduled to sunset June 30, 2010:

- Renewable Energy Production Tax Credit- Florida Statutes §220.193
- Renewable Energy Technologies Investment Tax Credit - Florida Statutes §220.192
- Renewable Energy Equipment Sales Tax Exemption - Florida Statutes §212.08(7)(ccc)
- Renewable Energy Technologies Grants Program - Florida Statutes §377.804
- Solar Energy System Incentives Program (Solar Rebate) - Florida Statutes §377.806

**Renewable Energy Production Tax Credit**

	2008	2009	2010	2011
Appropriation	\$5,000,000.00	\$5,000,000.00	\$5,000,000.00	\$5,000,000.00
Funds Expended	\$1,925,730.00	\$1,676,830.00	\$0.00	\$0.00
Balance	\$3,074,270.00	\$3,323,170.00	\$5,000,000.00	\$5,000,000.00
Percent of Funds Expended	38.51%	33.54%	n/a	n/a

**Renewable Energy Technologies Investment Tax Credit**

<b>Hydrogen (Vehicles)</b>	<b>FY06-07</b>	<b>FY07-08</b>	<b>FY08-09</b>	<b>FY09-10</b>
Appropriation	\$3,000,000.00	\$3,000,000.00	\$3,000,000.00	\$3,000,000.00
Funds Expended	\$0.00	\$0.00	\$0.00	\$1,547,586.75
Balance	\$3,000,000.00	\$3,000,000.00	\$3,000,000.00	\$1,452,413.25
Percent of Funds Expended	0.00%	0.00%	0.00%	51.59%
<b>Hydrogen (Stationary Fuel Cells)</b>	<b>FY06-07</b>	<b>FY07-08</b>	<b>FY08-09</b>	<b>FY09-10</b>
Appropriation	\$1,500,000.00	\$1,500,000.00	\$1,500,000.00	\$1,500,000.00
Funds Expended	\$0.00	\$0.00	\$1,500,000.00	\$1,500,000.00
Balance	\$1,500,000.00	\$1,500,000.00	\$0.00	\$0.00
Percent of Funds Expended	0.00%	0.00%	100.00%	100.00%
<b>Biodiesel &amp; Ethanol Infrastructure</b>	<b>FY06-07</b>	<b>FY07-08</b>	<b>FY08-09</b>	<b>FY09-10</b>
Appropriation	\$6,500,000.00	\$6,500,000.00	\$6,500,000.00	\$6,500,000.00
Funds Expended	\$3,347,482.62	\$4,519,660.30	\$2,473,456.24	\$0.00
Balance	\$3,152,517.38	\$1,980,339.70	\$4,026,543.76	\$6,500,000.00
Percent of Funds Expended	51.50%	69.53%	38.05%	0.00%

**Renewable Energy Equipment Sales Tax Exemption**

<b>Hydrogen (Vehicles)</b>	<b>FY06-07</b>	<b>FY07-08</b>	<b>FY08-09</b>	<b>FY09-10</b>
Appropriation	\$2,000,000.00	\$2,000,000.00	\$2,000,000.00	\$2,000,000.00
Funds Expended	\$0.00	\$0.00	\$0.00	\$0.00
Balance	\$2,000,000.00	\$2,000,000.00	\$2,000,000.00	\$2,000,000.00
Percent of Funds Expended	0.00%	0.00%	0.00%	0.00%
<b>Hydrogen (Stationary Fuel Cells)</b>	<b>FY06-07</b>	<b>FY07-08</b>	<b>FY08-09</b>	<b>FY09-10</b>
Appropriation	\$1,000,000.00	\$1,000,000.00	\$1,000,000.00	\$1,000,000.00
Funds Expended	\$0.00	\$0.00	\$219,004.98	\$235,176.90
Balance	\$1,000,000.00	\$1,000,000.00	\$658,944.91	\$764,823.10
Percent of Funds Expended	0.00%	0.00%	21.90%	23.52%
<b>Biodiesel &amp; Ethanol Infrastructure</b>	<b>FY06-07</b>	<b>FY07-08</b>	<b>FY08-09</b>	<b>FY09-10</b>
Appropriation	\$1,000,000.00	\$1,000,000.00	\$1,000,000.00	\$1,000,000.00
Funds Expended	\$0.00	\$3,982.60	\$41,349.06	\$482,726.69
Balance	\$1,000,000.00	\$996,017.40	\$958,650.94	\$517,273.31
Percent of Funds Expended	0.00%	0.40%	4.13%	48.73%

Some tax incentives have been used more than others. The Production Tax Credit has been consistently used and the bio-fuel infrastructure credit is showing increased consumption, but the hydrogen vehicle incentive has been barely used. The legislature should review each

technology granted a tax incentive and determine whether the tax code is the proper instrument to catalyze that market. If Florida elects to support pre-commercially deployed technologies, then the state should design incentives targeted to those technologies' needs. The data suggests there are state dollars allocated to these incentives that might be more productively used. In addition, it would be beneficial to examine the current method of information dissemination to the public regarding the state incentive program, to ensure the broadest coverage, application rate, and use of currently available incentives.

**Renewable Energy Technologies Grants Program**

	FY06-07	FY07-08	FY08-09	FY09-10
Appropriation	\$15,000,000.00	\$12,500,000.00	\$15,000,000.00	\$0.00
Funds Committed	\$15,000,000.00	\$12,500,000.00	\$15,000,000.00	\$0.00
Funds Expended	\$6,880,995.61	\$1,458,730.21	\$1,048,187.08	\$0.00

Since 2006, The Renewable Energy Technology Grant Program has distributed \$42.5 million dollars. Grants are attractive to industry because the application process is relatively straight forward and the awards are flexible. Although popular, the state may want to consider self-sustaining mechanisms such as: a loan program, performance based incentives, or an investment program rather than appropriating general revenue each year for the grant. The state may want to use public/private partnerships to leverage funding and engage a broader stakeholder group to select award winners.

**Solar Energy System Incentives Program (Solar Rebate)**

	FY06-07	FY07-08	FY08-09	FY09-10
Appropriation	\$2,500,000.00	\$3,000,000.00	\$5,000,000.00	\$14,400,000.00
Funds Expended	\$2,500,000.00	\$3,000,000.00	\$5,000,000.00	\$14,400,000.00
Balance	\$0.00	\$0.00	\$0.00	\$0.00
Percent of Funds Expended	100.00%	100.00%	100.00%	100.00%

Since 2006, the Solar Energy System Incentives Program (Solar Rebate) has distributed \$24.9 million dollars. The legislature should address the effectiveness and revise the Solar Rebate Program. The Solar Rebate's \$4 per watt subsidy has not changed since 2006 although both the cost of the technology and other incentives has reduced the need for the state subsidy. In addition to the declining costs of solar hardware, both the federal tax code and Florida Energy Efficiency and Conservation Act (FEECA) have provided alternative incentives. The Energy Improvement and Extension Act of 2008 (H.R. 1424) included an eight-year extension of the 30% personal income tax credit to December 31, 2016, the ability to take the credit against the alternative minimum tax, and the removal of the \$2,000 credit limit for solar-electric systems beginning in 2009. In 2009, FEECA utilities were authorized to provide up to \$24.5 million in total annual incentives for customer-owned solar water heaters and photovoltaic systems. The current rebate appears to be outdated and in light of other incentives, may need to be revised to encourage the deployment of residential and commercial solar systems.

## ***Barriers to Commercialization and Project Finance***

For this report, clean technology barriers of commercialization and project finance are divided into three major groups - technological, financial, and policy. The authors researched the availability of funds, and report on the “funding gaps” against what one would expect of a state with the nation’s 4<sup>th</sup> largest Gross State Product (GSP) in three lifecycle stages of clean technology development, finance, and commercialization.

The state of Florida is lagging behind its expected historical relative performance in funding all the stages of clean technology projects. There appears to be a glaring gap in resources available to clean technology entrepreneurs at all stages of clean technology development in Florida as compared to states with similar GSP. Florida does not compare favorably in terms of amounts financed, current assets, and system inputs related to new technologies including clean technology. Moreover, funding supplied to virtually all areas of venture creation has contracted, resulting in a more cautious venture capital market and less innovation making it to commercial production. The current economic landscape precludes Florida venture capitalists from assuming the same risk profiles in their investment portfolios as in the past decade and it appears that true clean technology seed funding of a significant amount is very limited in Florida.

This report identified the following main barriers to clean technology commercialization and project finance:

- Disparate and inconsistent policies and regulations affecting the industry which introduce an element of risk that detracts from the attractiveness of a potential investment.
- Clean technology developers’ perceived risks in terms of nascent technology, high initial costs, financial and business risks and potential revenue streams compared to investments in traditional industries
- Insufficient investments in R&D, especially by the federal and state government, which is interpreted by potential investors as a negative message that there is limited public support to create a business environment supportive of clean technology.
- First moves in policy, technology, product or marketing innovation by pioneering states, creating a financial, fiscal, social, and political environment conducive to new clean technology ventures.

## ***Regulatory Change – RPS Implementation***

The economic impacts of renewable portfolio standards (RPS) in individual states are difficult to quantify for two reasons. First, many states implement industry incentive programs in addition to an RPS and it may be difficult to separate the effects of industry incentives from any signal that is being given by an RPS. The second reason is that many state RPS policies are

relatively immature in the United States. As a result, available data make forensic analyses difficult.

Previous RPS economic impact studies are encouraging. There are already success stories in the application of an RPS enhancing employment and economic growth. An analysis was conducted to determine the effectiveness of best practice design elements for three individual policies: RPS, net metering, and interconnection. Some of the features of a well-designed RPS policy are found to significantly contribute to renewable energy development when looked at individually; however, none of them can be combined into a model that adequately predicts any of the renewable energy generation indicators.

Other important RPS policy decisions that Florida should consider include the following:

- Florida should evaluate the impact of an explicit cost associated with CO<sub>2</sub> emissions on conventional fuels and generation costs and in mitigating the need for government subsidization or mandate of clean energy technologies, and the relative impact of either program on short-term energy costs for consumers.
- RPS programs will not necessarily lead to increases in clean energy production as long as there is a cap on the price of renewable energy credits. However, the absence of a price cap puts consumers at risk of price spikes in the energy market.
- Current ten-year site plans show that Florida has no need for additional generating capacity beyond what is already planned for the next ten years, and producers are therefore more likely to purchase renewable energy credits or offsets elsewhere. The state might address the impacts of this situation with a comprehensive long-range capacity plan under various carbon pricing and technology scenarios.
- Conditions on capital investment and employment should accompany any incentive program for clean energy producers or manufacturers.

A February 2, 2010 study by Navigant Consulting<sup>1</sup> studied the impact of a national Renewable Electricity Standard (RES) program.<sup>2</sup> Its findings also support the implementation of a Florida RPS program in order to maximize economic development through job creation. Findings from the report pertinent to Florida include: 1) the biomass, hydropower, and waste-to-energy industries would see significant job gains in the Southeast United States under a strong national policy. Biomass jobs would double, with most of the increase concentrated in Louisiana, Florida, Georgia, Alabama and Kentucky. 2) Specifically for the state of Florida, the study found that without a national RES, Florida will gain up to 2,500 renewable electricity supported jobs between now and 2025. However, with a 25% RES by 2025, the state will see between 15,000 and 17,500 renewable electricity supported jobs. With a strong near-term target, Florida and Pennsylvania will see the largest job gains: between 5,000 and 7,500 additional jobs will be supported by 2014. A 20% RES in 2020 will support between 12,500 and 15,000 more renewable electricity jobs in the state than without a national policy. Stronger RES targets will mean more than 150,000 job-years of work by 2025 in the state of Florida.

---

<sup>1</sup> Navigant Consulting: Jobs Impact of a National Renewable Electricity Standard, February 2, 2010.

<sup>2</sup> See: <http://www.res-alliance.org/public/RESAllianceNavigantJobsStudy.pdf>.

## Conclusions and Recommendations

**Task 1 – Recommend to the Florida Energy and Climate Commission whether the state should (1) renew the current incentives “as-is” (2) renew the current incentives with technical changes and review of funding levels, or (3) allow the current incentives to sunset**

The results of the analysis show that the sun setting programs have had varying degrees of success and must be analyzed on an incentive-by-incentive basis. The following chart analyzes each sun setting activity:

Program Category	Availability in Florida	Recommendation	Pros	Cons
Solar Rebate	Solar Energy System Incentives Program Expires June 2010  FEECA utility programs	Amend: expiration date, decrease the subsidy and consider impact of FEECA. Link to project performance	<ul style="list-style-type: none"> <li>•Support market transformation</li> <li>•Adjustable</li> <li>•Provide upfront capital</li> <li>•Low administrative burden</li> </ul>	<ul style="list-style-type: none"> <li>•Create rebate dependency</li> <li>•Can be economically inefficient</li> <li>•Not linked to project performance</li> </ul>
State Corporate Tax Incentives	<ul style="list-style-type: none"> <li>▪ State Corporate tax incentives</li> <li>▪ Renewable Energy Production Tax Credit, Expires June 2010</li> <li>▪ Renewable Energy Technologies Investment Tax Credit Expires June 2010</li> </ul>	Continue and Amend: Only available to commercial  Continue and Amend: Include Residential  Continue and Amend: Include residential, remove hydrogen vehicles and stations	<ul style="list-style-type: none"> <li>•Easy to administer</li> <li>•Easy to modify</li> </ul>	<ul style="list-style-type: none"> <li>•Insufficient tax liability</li> <li>•Impact on state revenue</li> <li>•May not be the best incentive for each technology</li> </ul>
Renewable Sales Tax Exemptions	<ul style="list-style-type: none"> <li>▪ Renewable Energy Equipment Sales Tax Exemption Expires June 2010</li> <li>▪ Solar Energy Systems Equipment Sales Tax Exemption</li> </ul>	Continue and Amend: No expiration date  Continue the program as is	<ul style="list-style-type: none"> <li>•Easy to administer</li> </ul>	<ul style="list-style-type: none"> <li>•Not a strong incentive</li> </ul>
Renewable Energy Technology Grant Program	Expires June 2010	Continue and Amend: Investment/loan program instead of grant.	Investment/Loan Program <ul style="list-style-type: none"> <li>•Lower administrative requirements</li> <li>•Leverage private capital</li> <li>•Leverage state funds</li> <li>•Build lender confidence</li> <li>•Support innovative projects</li> </ul>	Investment/Loan Program <ul style="list-style-type: none"> <li>•Reliance on private lenders</li> <li>•Default risk</li> <li>•Narrow target market</li> </ul>

**Task 2 - Recommend to the Florida Energy and Climate Commission how to cater non-sun setting existing incentives to the clean technology sector**

Maximizing the benefits associated with an increase in federal funding of clean technology at all stages will require the state to implement the best net metering and interconnection standards. The state's goals should be to implement the best net metering and interconnection standards and at the same time, put in place state policies to alleviate the short-term increase in rates associated with such policies. The improved net metering and interconnection standards should explore the possibilities to expand net metering and interconnection standards to all utilities including municipal and co-operative utilities through

an opt-in process, to increase the capacity covered by the interconnection rules to a level that provides the greatest incentive for investors, to remove requirements for redundant external disconnect switches on larger systems, and to remove interconnection requirements for additional insurance on larger systems.

A major incentive for clean technology related to clean energy would be to calculate the “full avoided costs” in Section 366.051 of Florida Statutes based on the actual cost of renewable energy generation and provide a reasonable rate of return in order to make clean energy projects profitable. The new “full avoided costs” formula would be based on the type of clean energy resource or technology, potential carbon emission reduction, the size of the plant, the resource intensity of the renewable energy plant, the time of day in which generation occurs (i.e., peak or off-peak), and the geographic location. Another incentive is to enable clean technology developers to effectively recover investments in clean technology projects at the fully avoided costs of the projects.

### **Task 3 - Recommend to the Florida Energy and Climate Commission a portfolio of programs to decrease financial barriers to clean sector technology commercialization and project finance**

Although the State of Florida ranks 9th in the total number of programs offering financial incentives to renewable energy businesses, the state currently does not have in place certain important direct programs and incentives. In order to be more renewable energy friendly and create more opportunities for economic development, the state of Florida should consider implementing certain state-sponsored programs in addition to the programs and incentives already in place. The majority of clean energy developers believe that a combination of long-term carbon price, stable subsidies, higher targets and tax breaks is very important for institutional investors.

If Florida chooses to pursue clean technologies as an economic development opportunity, now is the time to benefit from a global pro- clean technology environment, with a fundamentally strong federal support and a strong performance of clean technology companies on the capital market. The following are proposed incentive programs that the state should investigate or implement in order to decrease financial barriers to clean technology commercialization and project finance: rebates, direct loans, matching loans, interest rate buy-down, linked deposits, leases, loan guarantees, RPS set-aside and renewable energy credits (RECs), state tax incentives and exemptions, production incentives and public benefit fund.

Additionally, a number of recommendations are offered for consideration to reduce barriers to commercialization and project finance, including:

- R&D Stage
  - Support the Innovation Caucus initiative to increase SUS funding and provide university GAP Program funding.
  - Build R&D partnerships with industry by expanding the Florida High Tech Corridor Council model focused on clean technology across Florida.
- Early Stage Capital
  - Allow angel & corporate investors to earn a transferable corporate income tax liability credit for qualified high risk early venture investment.

- Expand the Florida Opportunity Fund to invest in pre-commercialized clean technology.
- Mid to Late Stage Capital
  - Enhance the state’s role as a purchaser of clean technology (e.g. energy efficiency).
- Project Finance
  - Enact policy to drive clean technology market demand as outlined in the report.
  - Partner with corporate leaders and others to establish a special purpose fund which can be used in loan guarantee programs, longer term grants to support commercialization of clean technologies, and other similar purposes
  - Authorize Florida to partner with DOE to access the Section 1705 Loan Guarantee Program that could help Florida secure \$400–800M of federal loan guarantees

**Task 4 – Recommend to the Florida Energy and Climate Commission whether to pursue an RPS or a CES.**

An RPS package that combines direct or indirect payments with production incentives may serve the dual purpose of attracting investment and mitigating the risk to the government agency. The previous economic impact studies are encouraging, although it can be difficult to distinguish the policy effects of RPS from the effects of economic incentives. While an RPS increases the demand for targeted renewable energy products and services, reduces the carbon footprint of electricity in a state and reduces the need for rebates, it does not provide much needed upfront capital, almost certainly leads to higher electricity prices and places additional administrative and oversight burden on a state. Unlike a state RPS, a CES (or Clean Energy Standard) expands the scope of available energy technologies to include nuclear energy. Nuclear power is considered a clean energy and generates a large amount of energy, but has some limitations such as the uncertainty associated with the disposal of nuclear waste.

**Task 5 – Recommend to the Florida Energy and Climate Commission effective demand side incentives**

Recognizing the importance of providing the right financing incentive, the federal government created through ARRA 2009 the Clean Energy Finance Authority (CEFA) which is designed to promote a clean energy future for America. States around the country have also created similar programs. Property-Assessed Clean Energy (PACE), an emerging clean technology financing program, is quickly becoming a key incentive for residential and commercial property owners to invest in clean technology projects. Although existing Florida laws permits municipalities and counties to create special districts for financing projects that serve the public purpose and benefit the municipality or county, as of January 2010, no counties or municipalities in Florida have created such special districts for PACE financing programs. The Florida Legislature should investigate barriers to properly functioning PACE programs, through an analysis of existing successful PACE models in other states.

Many states around the country are also developing innovative financing mechanisms designed to help finance the high upfront costs of clean technologies. The state of Florida

should explore the development of those financing mechanisms which include a Green Bank, Clean Technology Victory Bonds, Tax Credit Bonds, State Loan Guarantees, energy efficiency and conservation block grant (EECBG) models, Cleantech City Funds and Public Benefit Funds (PBF).

As no state loan guarantee program (LGP) currently exists, Florida LGP, if implemented, should be modeled after the federal LGP. In order to improve the implementation of a state LGP and to help mitigate risk to the state taxpayers, we recommend that an analysis of the federal LGP be performed to determine improvements to a similar program for Florida and adopts the recommendations that the federal Government Accountability Office (GAO) recently issued for improvement of the federal LGP.