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# **ENERGY & UTILITIES POLICY COMMITTEE**

**Tuesday, December 8, 2009  
3:00 PM – 6:00 PM  
Morris Hall**

# **MEETING PACKET**

**Larry Cretul  
Speaker**

**Stephen Precourt  
Chair**

# **Committee Meeting Notice**

## **HOUSE OF REPRESENTATIVES**

### **Energy & Utilities Policy Committee**

**Start Date and Time:** Tuesday, December 08, 2009 03:00 pm

**End Date and Time:** Tuesday, December 08, 2009 06:00 pm

**Location:** Morris Hall (17 HOB)

**Duration:** 3.00 hrs

**Workshop on the following:**

Workshop on Energy Planning and Policymaking in Florida

**NOTICE FINALIZED on 12/03/2009 08:19 by SIMS-DAVIS.LINDA**



# **The Florida House of Representatives**

**General Government Policy Council**

**Energy & Utilities Policy Committee**

**Larry Cretul**  
**Speaker**

**Stephen L. Precourt**  
**Chair**

## **AGENDA**

**December 8, 2009**

**3:00 p.m. – 6:00 p.m.**

**Morris Hall (17 House Office Building)**

**Opening Remarks by Chair Precourt**

**ENERGY 101: An Overview of Energy Planning and Policymaking in Florida – Where Are We? How Did We Get Here?**

**Staff Presentation on the Evolution of Energy Policies in Florida from 2005 to the Present**

- **Lucretia Shaw Collins, Staff Director, Energy & Utilities Policy Committee**

**Presentations from the following:**

- **Curt Kiser, General Counsel, Florida Public Service Commission**
- **Bob Trapp, Assistant Director, Division of Regulatory Analysis, Florida Public Service Commission**
- **James F. Murley, Chairman, Florida Energy & Climate Commission**
- **Dr. Tim Anderson, Director, Florida Energy Systems Consortium**

**Closing Remarks by Chair Precourt**

**Adjournment**

**Lucretia Shaw Collins**  
**Staff Director**



# Evolution of Energy Policies in Florida

2005 to the Present

Energy & Utilities Policy Committee  
December 8, 2009



# What Is Florida's Energy Policy?

Does the Florida Legislature provide adequate guidance to state agencies, other governmental entities, and the private sector to develop and evaluate specific policies and programs necessary to achieve a comprehensive, long-term, environmentally compatible, sustainable, and efficient strategic energy plan for the state?



# 2005 Executive Order #05-241

- ▶ On November 10, 2005, Governor Jeb Bush, through an executive order, directed the Department of Environmental Protection (DEP) to develop a comprehensive energy plan.
- ▶ On December 14, 2005, the Secretary of the DEP hosted the Florida Energy Forum to allow for input in developing the plan.
- ▶ The DEP issued the Florida Energy Plan on January 17, 2006.



# Additional goals for electric utilities

In 2005, the Legislature found that “[r]enewable energy resources have the potential to help diversify fuel types to meet Florida’s growing dependency on natural gas for electric production, minimize the volatility of fuel costs, encourage investment within the state, improve environmental conditions, and make Florida a leader in new and innovative technologies.”

# 2006 Legislative Adoption of CS/CS/CS/SB 888

- ▶ Creation of the Florida Energy Commission
- ▶ Nuclear Power Plant Siting
- ▶ Streamlining of the Siting Acts for Power Plants and Transmission Lines
- ▶ Alternative Energy Incentives



# Florida Energy Commission (FEC)

- ▶ This nine-member commission, located within the Office of Legislative Services, was created to develop recommendations for legislation to establish a state energy policy based on specific principles.
- ▶ The FEC was required to file an annual report with the Legislature addressing:
  - Incentives for alternative energy research, development, or deployment;
  - Policy recommendations for conservation of all forms of energy;
  - Processes that evaluate greenhouse gas emissions;
  - Steps and schedule for the development of a comprehensive state climate action plan; and
  - Plan of action, with a timetable, for addressing additional energy issues.

# Nuclear Power Plant Siting

In addressing nuclear power plants, the 2006 Legislature directed the PSC to provide for advanced recovery of the costs of siting, design, licensing, and construction of a nuclear power plant before it is placed into production with the intent of removing impediments to development of new nuclear power in Florida.

# Alternative Energy Incentives

- ▶ The Renewable Energy Technologies Grants Program was created in the DEP to provide matching grants for demonstration, commercialization, research, and development projects relating to renewable technologies (\$15 million appropriated).
- ▶ A one-week sales tax holiday on new energy-efficient products of \$1,500 or less was established.
- ▶ A rebate program for purchases of solar photovoltaic systems or solar thermal systems, including pool heaters was created.
- ▶ A sales tax exemption; an investment tax credit; and a renewable energy production tax credit were created.

# 2007 – 100 Innovative Ideas for Florida’s Future

Prior to the 2007 legislative session, under the leadership of Speaker Marco Rubio, a book entitled *100 Innovative Ideas for Florida’s Future* was released. Seven (7) of those ideas made reference to energy efficiency and alternative fuel production and contemplated that the Legislature would aggressively seek to provide incentives for consumers, developers, and communities to become more energy conscious and to develop alternative energy markets.

# 2007 - CS/HB 7123 VETOED

Legislation passed by the 2007 Legislature attempted to implement many of the Innovative Ideas and promote energy affordability and reliability by encouraging energy efficiency and diversity.

Governor Crist vetoed the legislation stating that “It did not go far enough.”

# Governor Crist's 2007 Executive Orders

The Serve to Preserve Summit on Global Climate Change was convened and Governor Crist signed three (3) executive orders outlining his climate change and energy initiatives as follows:

1. Reduce greenhouse gas emissions from state governmental buildings and vehicles;
2. Adopt maximum emission levels for electric utilities and new motor vehicles; and
3. Create the Governor's Action Team on Energy and Climate Change.



# House's Response

The House of Representatives scheduled a series of workshops and hearings to look at the science and economics of global climate change. A “Symposium on the Science and Economics of Climate Change” was conducted and state and national scientists and economists were invited to engage in dialogue with the members. These discussions also focused on Florida’s inability to meaningfully affect the causes of climate change acting alone.

# Responses from Other Appointed Bodies

- ▶ The Governor's Action Team on Energy and Climate Change submitted a report to the Governor on November 1, 2007.
- ▶ On December 31, 2007, the Florida Energy Commission submitted its recommendations to the Legislature.

# 2008 - Enactment of HB 7135

- ▶ Florida's energy legislation was enacted in 2008 and was aimed at ensuring that energy remained affordable and reliable, while also addressing environmental concerns, including climate change.
- ▶ The four (4) interrelated policy issues addressed in the bill include:
  1. Governance of Energy Policy
  2. Climate Change and Greenhouse Gas Emissions
  3. Promotion of Alternative Renewable Energy
  4. Conservation & Energy Efficiency

# Governance of Energy Policy

- ▶ Creation of the Florida Energy & Climate Commission
- ▶ Revised Membership of the Public Service Commission Nominating Council
- ▶ Creation of the Florida Energy Systems Consortium



# Climate Change & Greenhouse Gas Emissions

- ▶ Cap-and-Trade Program
- ▶ California Motor Vehicle Emissions Standards
- ▶ Environmental Cost Recovery



# Promotion of Alternative Renewable Energy

- ▶ Renewable Portfolio Standards
- ▶ Full Cost Recovery for reasonable and prudent costs incurred by a public utility for renewable energy
- ▶ Advanced cost recovery for costs for electric transmission lines and facilities associated with a nuclear power plant
- ▶ Standardized interconnection agreements and net metering
- ▶ Renewable Fuel Standards

# Conservation & Energy Efficiency

HB 7135 emphasized that in many instances improved energy efficiency and conservation are the cheapest and most effective way to accomplish the related goals of energy affordability and reliability while also addressing concerns with climate change.



# 2009 Energy Legislation

- ▶ CS/HB 167 was enacted during the 2009 session to authorize the Florida Energy & Climate Commission to develop and administer a consumer rebate program for residential energy-efficient appliances.
- ▶ \$150,000 were appropriated for the administration of the rebate program.
- ▶ The General Appropriations Act provided spending authority for federal stimulus dollars under the American Recovery and Reinvestment Act of 2009 (ARRA).



# Additional Questions??

- ▶ With the enactment of all of these pieces of legislation, has the Legislature set clear priorities as to what the state energy policy is or should be?
- ▶ Do the statutes provide adequate, clear, and consistent guidance for the development and implementation of a state energy policy?

# State Comprehensive Plan

The ENERGY goal in the State Comprehensive Plan (s. 187.201, F.S.) is that “Florida shall reduce its energy requirements through enhanced conservation and efficiency measures in all end-use sectors and shall reduce atmospheric carbon dioxide by promoting an increased use of renewable energy sources and low-carbon-emitting electric power plants.”

# Energy Planning and Development

The broadest statement of the state’s energy goals and policies is set forth in s. 377.601, F.S., in which the Legislature finds that the “state’s energy security can be increased by lessening dependence on foreign oil; that the impacts of global climate change can be reduced through the reduction of greenhouse gas emissions; and that the implementation of alternative energy technologies can be a source of new jobs and employment opportunities for many Floridians.”

# Energy Planning and Development Cont'd

The Legislature further finds in s. 377.601(1), F.S., that, “...there is significant value to Florida consumers that comes from investment in Florida's energy infrastructure that increases system reliability, enhances energy independence and diversification, stabilizes energy costs, and reduces greenhouse gas emissions.”

# Goals and Policies for Florida's Electric Industry

Chapter 366, F.S., primarily identifies the goals and policies of the electric industry. Traditionally, there have been three primary and overarching goals established for the conduct and regulation of the electric industry in Florida:

1. Fair and reasonable rates;
2. Reliability; and
3. Safety.

# SUMMARY

In summary, the current statutory goals and policies related to the electric industry appear to include the following:

- Fair and reasonable rates (GOAL)
- Reliability (GOAL)
- Safety (GOAL)
- Reduce consumption and demand (POLICY)
- Improve system efficiency (POLICY)
- Use renewable energy resources (POLICY)
- Diversify fuel supply (POLICY)
- Lessen dependence on natural gas and fuel oil (POLICY)
- Minimize fuel cost volatility (GOAL)
- Increase investment in Florida (GOAL)
- Improve “environmental conditions” and reduce greenhouse gas (GHG) emissions (GOAL)
- Encourage new nuclear power (POLICY)



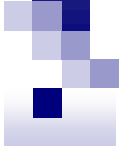






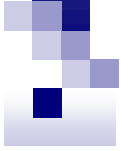
**Electric Industry Policy and  
Current Issues**  
*Presentation to the:*  
**Florida House of Representatives  
Energy & Utilities Policy Committee**

**Bob Trapp**  
**Division of Regulatory Analysis**  
**Florida Public Service Commission**  
**December 8, 2009**



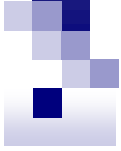
## **Recent Legislative Energy Policy Guidance**

- 2005-2009 - concerns with the impact of fuel cost increases on Florida's economy and the need for fuel diversity
- Legislature encouraged additional:
  - Conservation
  - Renewables
  - Low-cost fuel generation (Coal & Nuclear)



## **Electric Utility Policy in Florida**

- **The Public Service Commission ensures that electric utilities provide adequate, reliable service at the lowest possible cost**

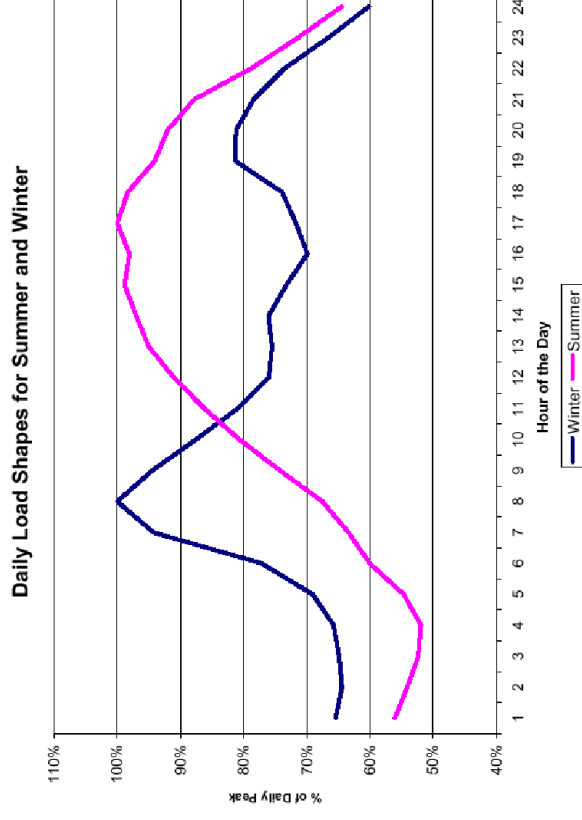


# How Does the FPSC Implement Energy Policy?

- Through the regulation of investor-owned utilities by:
  - Review of the costs to provide service and establishment of customer rates
  - Authority to order additions or improvements to ensure grid reliability
  - Monitoring the quality of electric service
  - Oversight of ten-year plans for meeting customer needs
  - Determination of need for major power plant and transmission line additions to ensure the most reliable and cost-effective alternative is selected
  - Establishment of conservation goals and oversight of cost-effective conservation programs
  - Review of contracts for purchased power from renewable generators and approval for cost recovery

# How to Meet Customer Requirements in a Reliable, Cost-Effective Manner?

- By statute, utilities are obligated to serve all customers
- A utility considers all feasible resources to meet customer requirements:
  - Conservation
  - Energy purchases from renewable & alternative generators
  - Energy purchases from other utilities
  - Utility-owned generation
- Customer load and energy requirements change during the day and during the year
- A utility selects a mix of resources that minimize total costs and meet reliability criteria





## Recent Legislative Energy Initiatives - Conservation

- 2008 legislation amended the Florida Energy Efficiency and Conservation Act (FEECA), directing the FPSC to:
  - Establish goals for demand-side renewable systems, in addition to goals for increasing energy efficiency
  - Evaluate the technical potential of conservation measures
  - Consider costs and benefits to customers who participate in a conservation program
  - Consider costs and benefits to all customers who pay for conservation
  
- December 1, 2009, the FPSC established aggressive numeric conservation goals based on the Total Resource Cost (TRC) test that take into account the costs and benefits to all customers
  
- The FPSC also required investor-owned utilities to offer programs that promote and offer rebates for solar thermal and photovoltaic technologies
  - Annual program expenditure cap of 10% of historical conservation program expenses (approximately \$24 million per year)

## Recent Legislative Energy Initiatives - Conservation

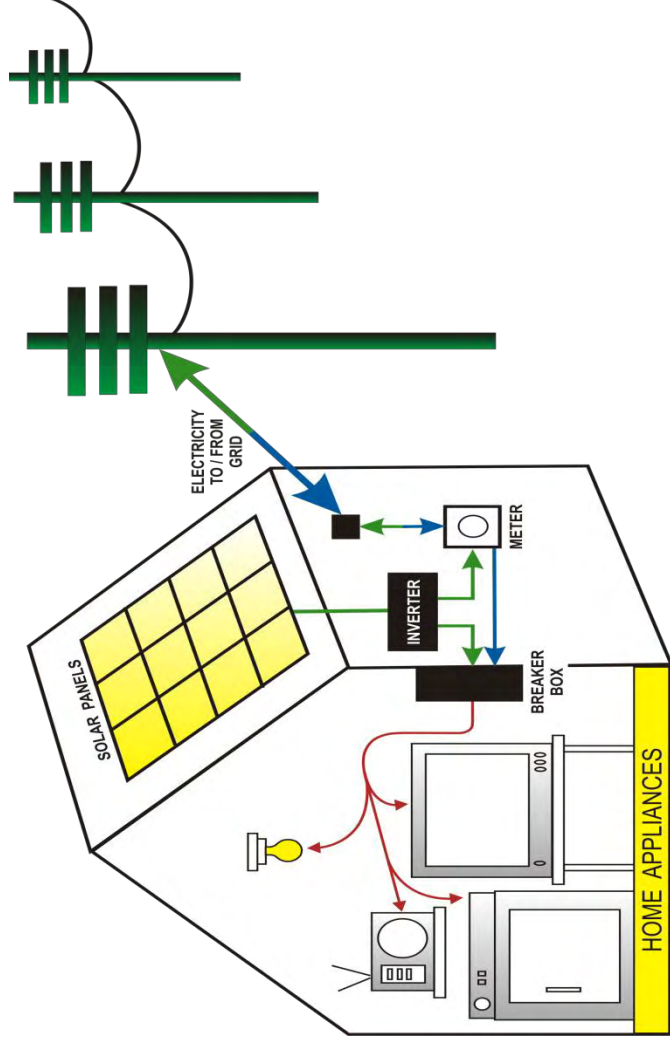
Existing Conservation Programs - Monthly Residential Bill Impact					
	FPL	PEF	TECO	Gulf	
2010 Monthly Costs 1,200 kWh bill	\$2.25	\$3.24	\$3.05	\$1.30	
Solar Program Cost Cap – Monthly Residential Bill Impact					
	FPL	PEF	TECO	Gulf	
Monthly Bill Impact 1,200 kWh bill	\$0.18	\$0.19	\$0.10	\$0.09	

- Existing program cost should increase in 2011 in order to meet the new aggressive numeric goals
- New conservation plans and programs will be submitted in Spring 2010 for FPSC review and approval



# Customer-Owned Renewable Generation

- Florida statutes require all utilities to offer standard interconnection agreements and net metering
- Renewable systems act as a conservation measure by first reducing a customer's purchases from the utility
- FPSC rules require the investor-owned utilities to meter excess energy the customer delivers to the grid
- The excess energy is carried forward to the next month's bill, for up to 12 months at the retail rate, thus reducing future bills
- Municipal and rural electric cooperatives offer varying types of net metering policies



# Purchases from Renewable and Alternative Generators

- Florida statutes require utilities to interconnect with and purchase electricity from renewable and alternative generators
- Utilities are to purchase energy at rates that do not exceed the utility's cost to produce electricity
- Thus, customers experience the same level of reliability and cost
- 2005 legislation requires the FPSC to establish standard contract terms for renewable and alternative generators while maintaining the utility cost and reliability standards





# Recent Legislative Energy Initiatives - RPS

- 2008 legislation (HB 7135) - Renewable Portfolio Standard (RPS)
  - FPSC directed to submit draft RPS by January 30, 2009 for ratification
- Electric utilities would be required to provide a percentage of energy to customers from renewable resources in Florida
- Legislative intent:
  - Encourage new and protect existing renewables
  - Diversify the types of fuel used to generate electricity
  - Reduce Florida's dependence on natural gas and fuel oil
  - Encourage investment within the state
  - Improve environmental conditions
  - Minimize the costs of electricity to customers
- Upon ratification of the rule, the statute allows the FPSC to authorize payments to renewable generators above the utility's cost to produce electricity, but does not set a rate cap



# FPSC Draft RPS Rule

- FPSC submitted a draft rule to the Legislative on January 30, 2009
- The FPSC considered three options:
  - Market-based approach
  - Standard offer contract approach
  - Clean energy portfolio
- The options would allow utilities to purchase renewable energy at rates higher than the utility's cost to produce energy
- The amount paid above the utility's cost to produce energy would be limited to 2% of the utility's total annual revenues
- Conditions considered under which noncompliance shall be excused if the cost of securing renewable energy or RECs was cost prohibitive



# FPSC Draft RPS Rule

- REC Market-based approach
  - Electricity purchased at rates that do not exceed the utility's cost to produce electricity
  - Renewable Energy Credits (RECs) purchased to provide additional return to renewable generators
    - RECs represent the renewable attribute of renewable energy
- Standard offer contract approach
  - FPSC establishes levelized cost by renewable type
  - Competitive bidding process by renewable type
  - FPSC reviews and approves renewable capacity awards
- Clean energy portfolio
  - Include as eligible resources: conservation, generation efficiency improvements and nuclear, in addition to renewables
  - Provides a more comprehensive assessment of the most cost-effective means of meeting the standard
  - Expansion of eligible resources would reduce the cost to comply
  - Increases likelihood of achieving compliance

# FPSC Draft RPS Rule

- The chart below shows estimated costs and bill impacts for various rate caps associated with the purchase of Renewable Energy Credits (RECs)
- The FPSC draft rule would establish a 2% cap of annual utility revenues for such costs
- Note, these costs are in addition to the cost of electricity from renewable generators

Estimated Costs and Bill Impacts for REC Rate Caps						
	Cap - 1% of Annual Revenues	Cap - 2% of Annual Revenues	Cap - 4% of Annual Revenues	Monthly Bill Impact 1,200 kWh/month		
				Cap - 1% (\$/Month)	Cap - 2% (\$/Month)	Cap - 4% (\$/Month)
FPL	\$112,648,020	\$225,296,040	\$450,592,080	\$1.18	\$2.37	\$4.73
PEF	\$41,383,779	\$82,767,558	\$165,535,116	\$1.04	\$2.09	\$4.17
TECO	\$20,410,858	\$40,821,716	\$81,643,432	\$1.15	\$2.30	\$4.60
Gulf	\$10,282,092	\$20,564,184	\$41,128,368	\$0.97	\$1.95	\$3.90
<b>Total</b>	\$184,724,749	\$369,449,498	\$738,898,996			

## Recent Legislative Energy Initiatives - Nuclear

- Utilities will increase dependence on natural gas as a generating fuel over the next 10 years
- 2006 – legislation enacted requiring the FPSC to consider fuel diversity in determining the need for nuclear units
- 2006 - legislation enacted to encourage the development of nuclear energy
  - Statute identifies certain costs eligible for recovery prior to the in-service date of the unit
  - Intended to reduce the long-term rate impact of nuclear additions
- Investment in higher capital cost, but low-fuel cost generation will reduce:
  - Dependence on natural gas
  - Fuel cost fluctuations
  - Fuel costs to customers





## Future Bill Impacts for Nuclear Expansion

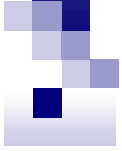
- FPL's 2 new Turkey Point Units are currently estimated at \$17-20 billion, in-service 2018 & 2020
- PEF's 2 Levy Nuclear Units are currently estimated at \$18 billion, in-service 2018 & approximately 2019
- The difference in costs is driven primarily by transmission requirements
- PEF is building on a greenfield, rather than an existing site
  - Land cost is estimated at less than 1% of the total cost for PEF
- Once operational, the nuclear units are estimated to save about \$1 billion per year in fuel costs for each utility – primarily from natural gas



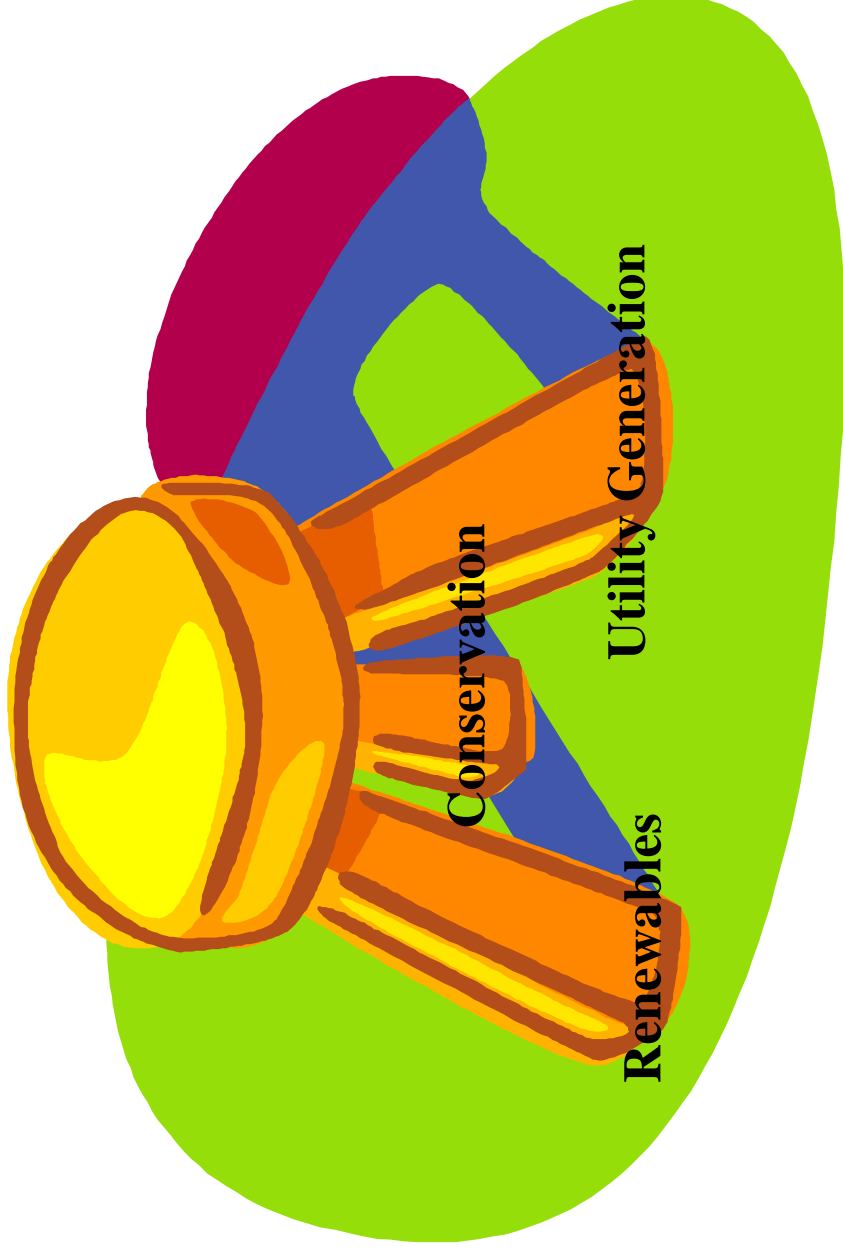


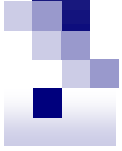
## **Nuclear Costs Approved for Recovery Pursuant to the Statute**

- Residential customers with a 1,200 kWh monthly bill will be charged in 2010 approximately:
  - \$0.80 for Florida Power and Light (FPL)
  - \$8.39 for Progress Energy (PEF)
- Reasons for the difference in rates:
  - PEF is incurring more costs sooner due to earlier in-service date (2016)
  - FPL has a much larger customer base, thus more kWhs to spread costs



# Integrated Planning is Like a Three-Legged Stool





Given new direction of energy  
independence, environmental concerns  
and alternative energy development,  
how much are we willing to pay?







# **Overview of the Florida Energy & Climate Commission's Statutory Responsibilities**

**James F. Murley**

**Chairman**



# FECC Overview

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- Created by the 2008 Energy and Economic Development Legislation (HB 7135), the Commission's authorizing statute is s. 377.6015, F.S.
- The Commission is comprised of 9 members, 7 appointed by the Governor, 1 appointed by the Commissioner of Agriculture, and 1 appointed by the Chief Financial Officer
- The Commission is administratively housed within the Executive Office of the Governor



# FECC Membership

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- James F. Murley, Chair
- Kathy Baughman McLeod
- Nils J. Diaz
- Howell L. Ferguson
- Nicholas C. Gladding
- Debra S. Harrison
- Timothy T. Jackson
- Christian H. Poindexter, Commissioner of Agriculture Appointee
- John “JB” Clark, CFO Appointee





## **Section 377.6015, F.S. - Establishes the Commission and identifies major duties and responsibilities**

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- Conduct at least six meetings each year;
- Administer the Renewable Energy and Energy-Efficient Technologies Grants Program, previously referred to as the “Renewable Energy Technologies Grants Program” (s. 377.804, F.S.);
- Develop policy for royalty-sharing or licensing agreements with grantees for commercialized products developed under those grants;
- Administer the Florida Green Government Grants Act;
- Administer information gathering and reporting functions of ss. 377.601 through 377.608, F.S.;
- Administer petroleum planning and emergency contingency planning pursuant to ss. 377.701, 377.703, and 377.704, F.S.;



## **Section 377.6015, F.S. - Establishes the Commission and identifies major duties and responsibilities**

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- Represent Florida in the Southern States Energy Compact;
- Complete the annual assessment of the Florida Energy and Climate Change Action Plan following completion of the Governor's Action Team on Energy and Climate Change in October 2008;
- Administer the provisions of the Florida Energy and Climate Protection Act (review the proposed cap-and-trade regulatory program and report to the Legislature);
- Advocate for energy and climate change issues and provide educational outreach and technical assistance in cooperation with state universities;
- Be a party in the proceedings to adopt energy efficiency goals and submit comments to the PSC pursuant to s. 366.82, F.S.; and
- Adopt rules to implement all powers and duties of the Commission.



## Commission Responsibilities - Administration of Federal Energy Programs

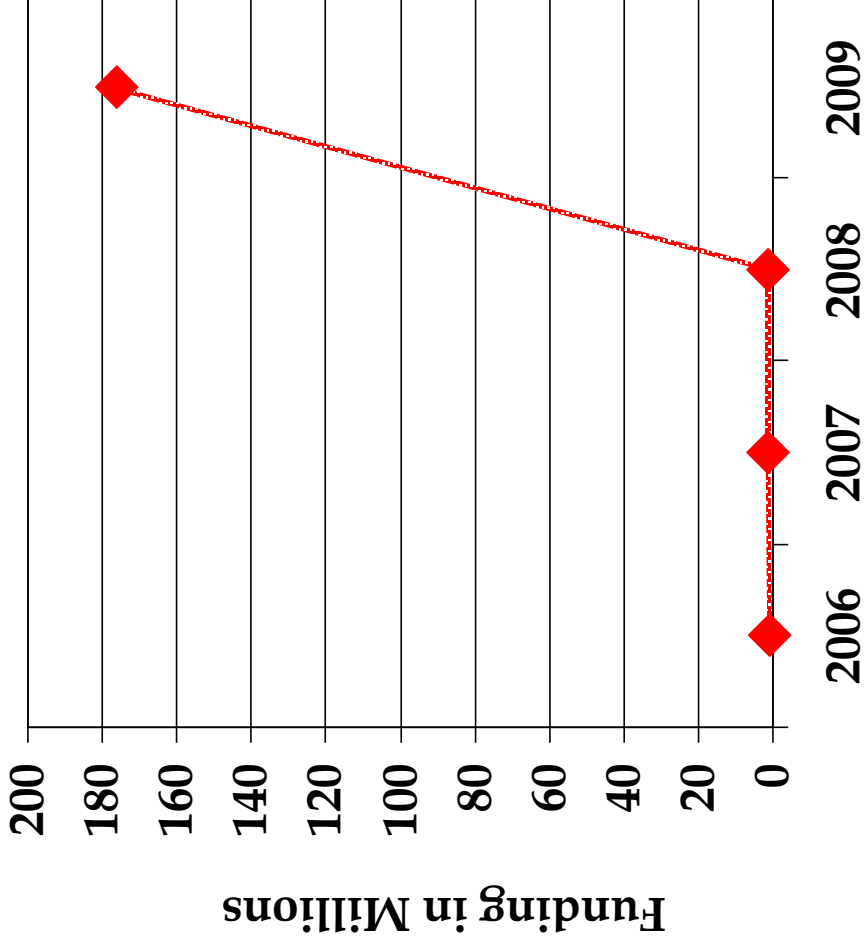
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### **Section 377.703 (b) (c) (d), F.S.,**

- (b) The commission shall be responsible for performing or coordinating the functions of any federal energy programs delegated to the state, including energy supply, demand, conservation, or allocation.
- (c) The commission shall analyze present and proposed federal energy programs and make recommendations regarding those programs to the Governor and the Legislature.
- (d) The commission shall coordinate efforts to seek federal support or other support for state energy activities, including energy conservation, research, or development, and shall be responsible for the coordination of multiagency energy conservation programs and plans.



# Federal Funding by Year



160% funding increase from 2008 to 2009



# 2009-2012 Federal ARRA Funding

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- State Energy Program (SEP)..... \$126,089,000.00
- Energy Efficiency & Conservation
- Block Grant (EECBG)..... \$30,401,600.00
- Energy Efficient Appliance Rebate.... \$17,585,466.00
- Energy Assurance Grant Program..... \$1,881,676.00
  
- **TOTAL**.....**\$175,958,742.00**



## Commission Responsibilities - Renewable/Energy Efficiency Financial Incentives

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- Renewable Energy and Energy-Efficient Technologies Grants (Section 377.804, F.S.)
  - \$15 million was awarded in February for FY 08-09 grants
- Solar Energy System Incentives (Section 377.806, F.S.)
  - To date, nearly \$24.4 million in rebates have been dispersed or is scheduled to be dispersed
    - \$10 million in state funds
    - \$14.4 million in federal stimulus funds



## Commission Responsibilities - Renewable/Energy Efficiency Financial Incentives

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- Renewable Energy Technologies Investment Tax Credit (Section 220.192, F.S.)
  - To date, nearly \$13 million in tax credits has been dispersed or is scheduled to be dispersed by DOR
- Sales Tax Exemption for Renewable Energy Technologies (Section 212.08, F.S.)
  - To date, nearly \$1 million in sales tax has been exempted by DOR



## Commission Responsibilities - Planning, Coordination, and Emergency Management

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- **Energy-Related Data Collection and Reporting (Sections 377.603 - 377.608, and 377.701, F.S.)**
  - The most recent Fuel Report was posted on the Commission's Web site in September
  - The Commission is currently analyzing Florida's energy related incentives
- **Energy-Related Emergency Management (Sections 377.701 - 377.703, F.S.)**
  - The ESF-12 (Fuels) Desk at the Emergency Operations Center was activated on 3 occasions in 2009





## Commission Statutory Responsibilities - Energy and Climate Policy Development

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- Florida Energy and Climate Commission (Section 377.6015, F.S.)
  - The FECC has held 14 meetings since January 2009
- Florida Energy Efficiency and Conservation Act (Section 366.82, F.S.)
  - The FECC filed comments on FEECA with the Florida Public Service Commission
- Renewable Portfolio Standard (Section 366.92, F.S.)
  - The FECC voted to endorse the Renewable Portfolio Standard (RPS) submitted to the Legislature by the FPSC



## Commission Statutory Responsibilities - Energy and Climate Policy Development

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- Florida Climate Protection Act (Section 403.44, F.S.)
  - DEP has suspended rulemaking on Cap and Trade
- Life-Cycle GHG Emissions/Renewable Fuels (Section 526.207, F.S.)
  - The initial study from UF is under review. The FECC's report is due to the Governor and Legislature on 12/31/10
- Florida Energy Systems Consortium (Section 1004.648, F.S.)
  - Commissioner Nick Gladding serves on the FEESC Steering Committee
  - On 9/29/09, the Commission held a joint meeting with FEESC in Tampa









# Florida Energy Systems Consortium

## Presented to the House Energy and Utilities Policy Committee

Tim Anderson, Director



# Messages

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- FESC is doing very well
  - Your support is making a difference –  
thank you
- The Consortium is a key State resource for economic development

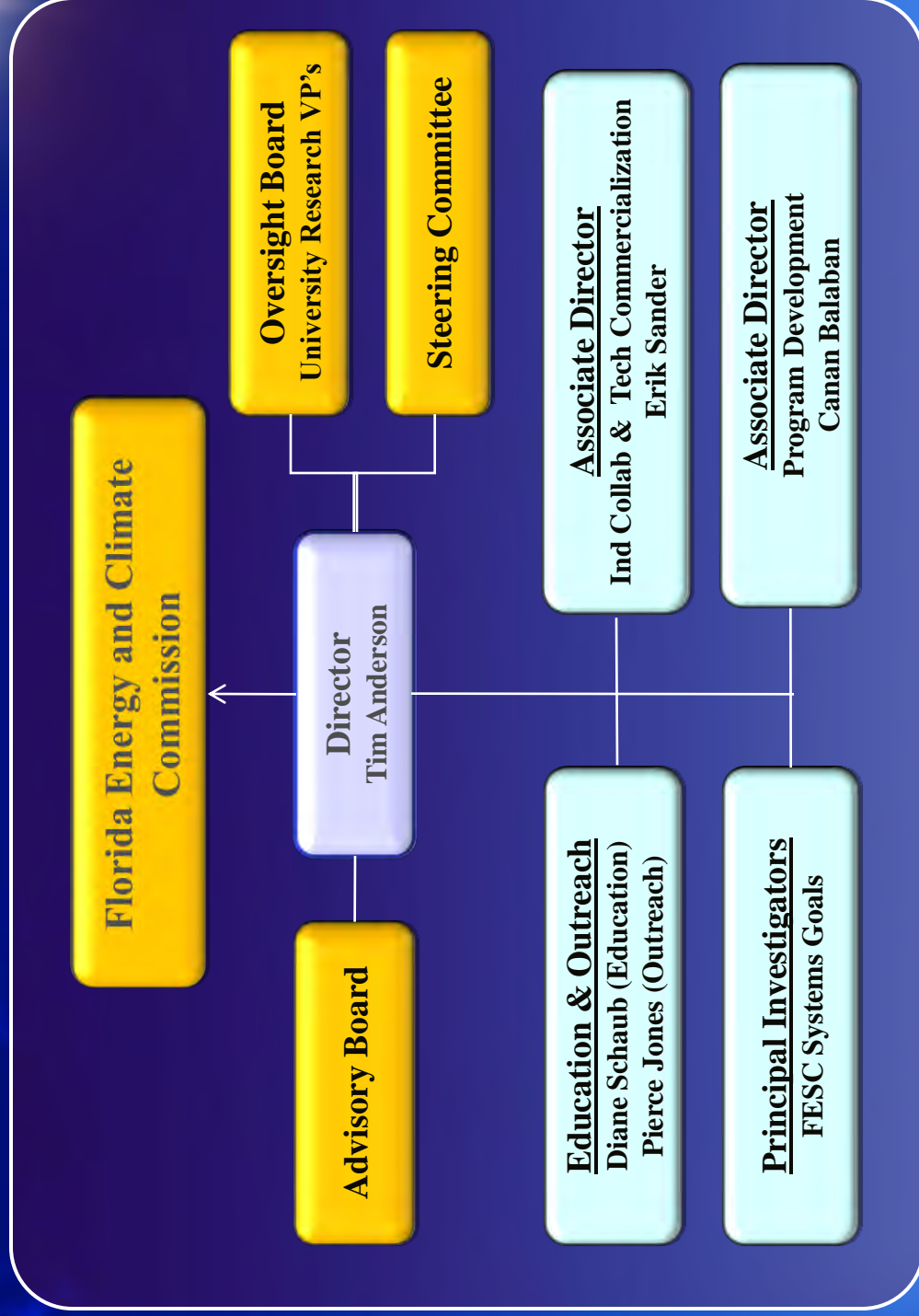
# Legislative Mandate and Vision

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- Legislative Mandate
  - Promote collaboration among experts in the SUS 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.
  - Focus 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.
- FESC Vision
  - Leadership in energy research enabled by a systems approach



# Leadership Structure



# Advisory Board

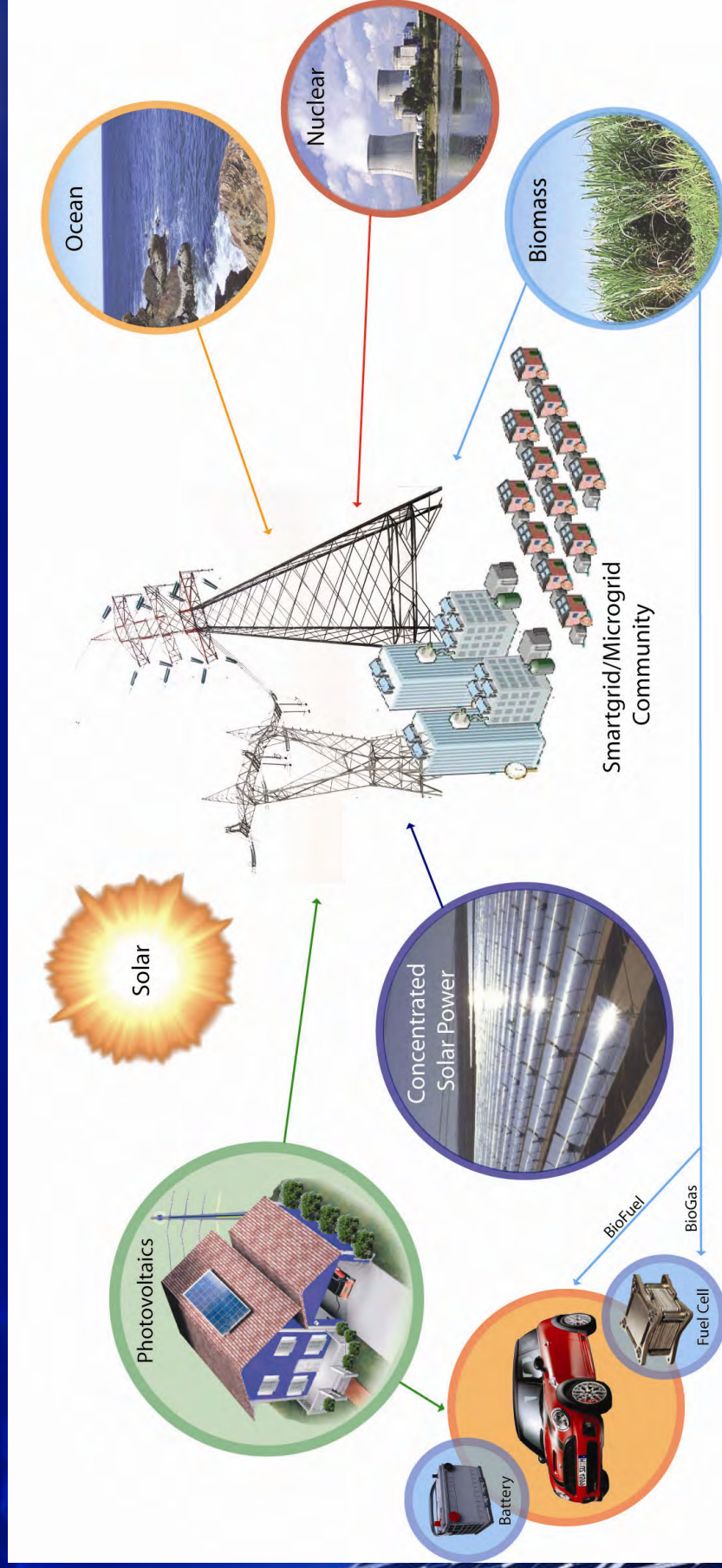
<b>Institution</b>	<b>Representative</b>
Florida Crystals Corp.	Gustavo Cepero, Vice President
FPL	Buck Martinez, Sr. Director of Project Development
Gulf Power	Bentina Terry, VP, External Affairs & Corp. Services
Holland & Knight, LLP	Tommy Boroughs, Partner
Milcom Venture Partners	Chris Fountas, Partner
Ocean Renewable Power	Christopher Sauer, President & CEO
Orlando Utilities Comm.	Byron Knibbs, VP Sustainable Services
Progress Energy	Rob Caldwell, VP Efficiency & Innovative Tech.
Scripps Research Inst.	Roy Periana, Director Scripps Energy Laboratories
Siemens Power	Frank Bevc, Director Technology Policy
SUS Board of Governors	Sheila McDevitt, Chair
TECO	Greg Ramon, Director Regulatory Policy & Compl.

# Strategic Research Thrusts

- **Overarching - Understanding Florida's Energy Systems**
- Developing Florida's Biomass Resources
- Harnessing Florida's Solar Resources
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida
- Exploiting Florida's Ocean Energy Resources
- Securing our Energy Storage and Delivery Infrastructure

Enhancing Energy Efficiency & Conservation

# Strategic Approach: Energy Systems

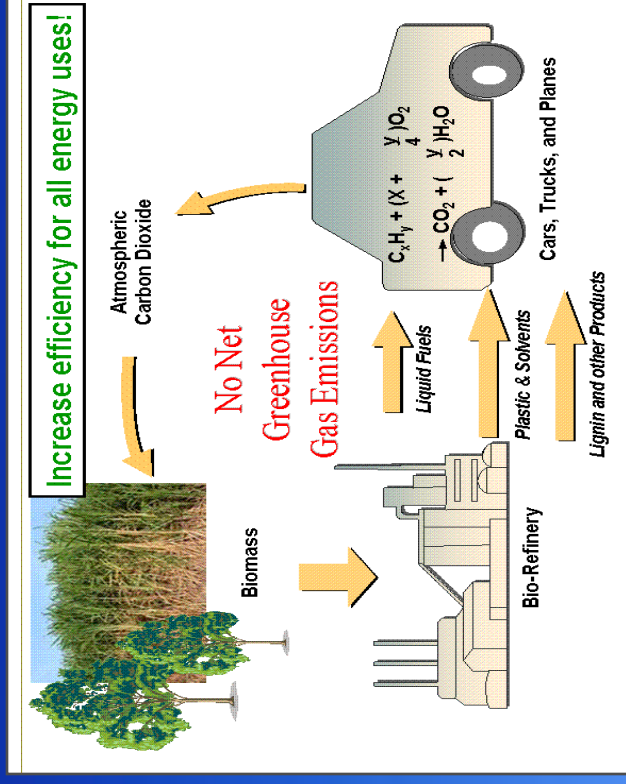
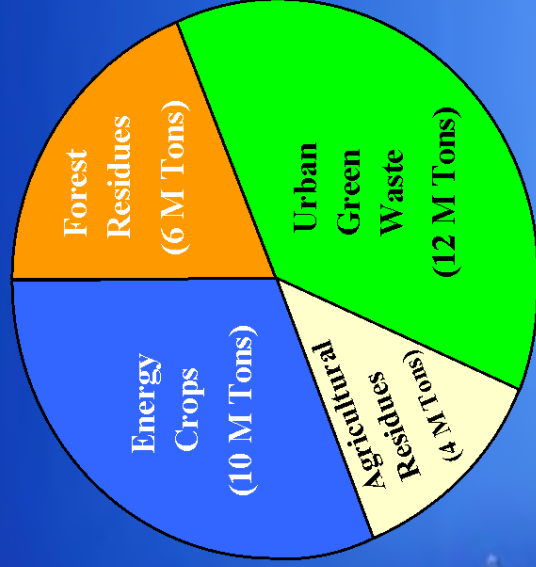
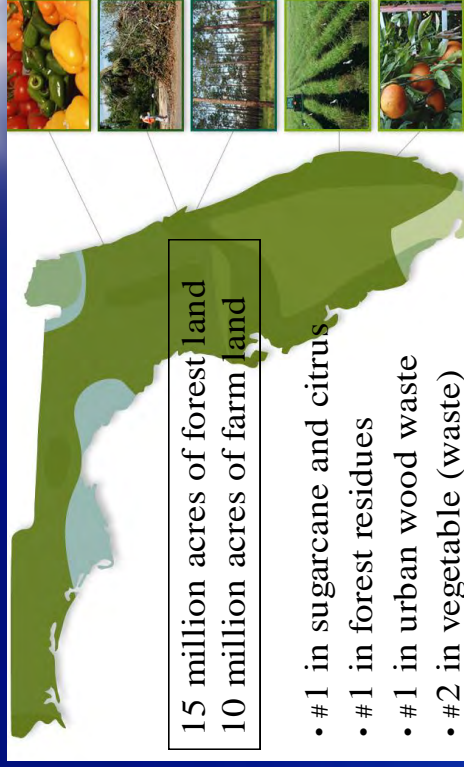


# Strategic Research Thrusts

- Overarching - Understanding Florida's Energy Systems
- **Developing Florida's Biomass Resources - Production of liquid fuels & other chemical intermediates (cellulosic ethanol, biodiesel) & gaseous fuels & feed stocks (gasification, anaerobic digestion), efficient conversion of biofuels to electric power (SOFCs, turbines), energy intensive crops, solid waste as a biomass resource**
- Harnessing Florida's Solar Resources
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida
- Exploiting Florida's Ocean Energy Resources
- Securing our Energy Storage and Delivery Infrastructure
- Enhancing Energy Efficiency & Conservation

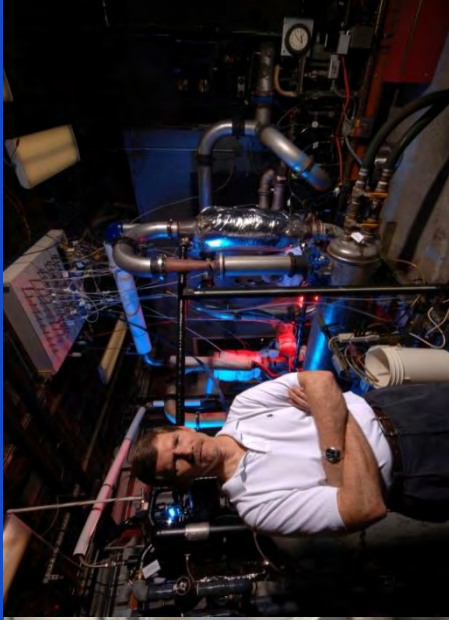
# Developing Florida Biomass Resources

- Florida has ~7% of US biomass resources
- 53% statewide tree coverage
- Florida Ethanol Potential
  - Current: 2-3B gallons/yr
  - Future: 5B+ gallons/yr



# Bio-Energy Research Focus Areas

- Energy Intensive Crop Development – molecular genetics
- Energy From Algae: Fresh water, marine algae; Genetic transformation; Solar photo-bioreactors; Lipids to fuels
- Thermo-Chemical Conversion of Biomass to Liquid Fuels
- Biochemical Conversion Biomass to Liquid Fuels & Chemicals
- Integrated Biofuel, Hydrogen, and Electricity Cogeneration from Biomass and Solid Waste



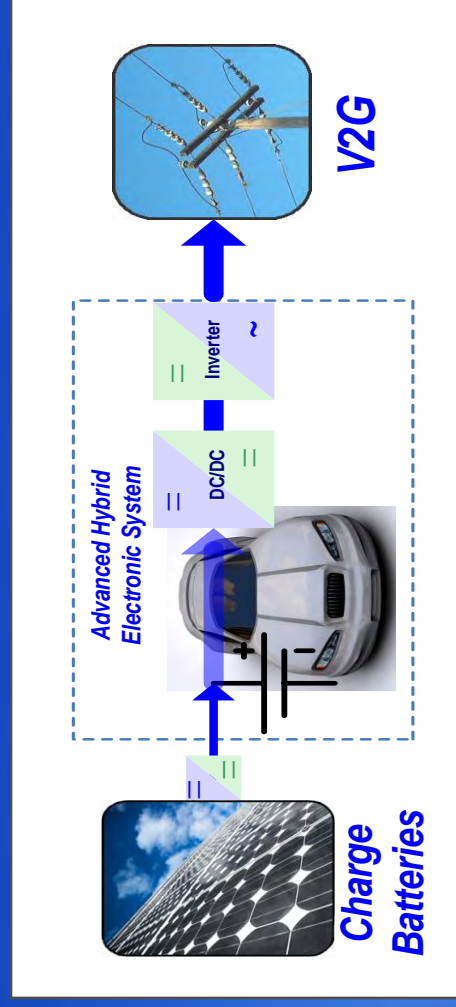
# Strategic Research Thrusts

- Overarching - Understanding Florida's Energy Systems
- Developing Florida's Biomass Resources
- **Harnessing Florida's Solar Resources - Photovoltaics, solar concentrators (fuel production, gasification), outreach and education in broad solar technologies**
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida
- Exploiting Florida's Ocean Energy Resources
- Securing our Energy Storage and Delivery Infrastructure
- Enhancing Energy Efficiency & Conservation



# Solar Energy Research Focus Areas

- Solar Thermal Power for Distributed Generation
- Design, Construction and Operation of CSP
- Low Cost CIGS Thin Film PV Process
- Non-Contact Energy Delivery for PV System
- PV Power Generation Using PHEV's as Energy Storage
- PV Panel-mounted Micro-inverter
- Integrated PV/Storage and PV/Storage/Lighting Systems

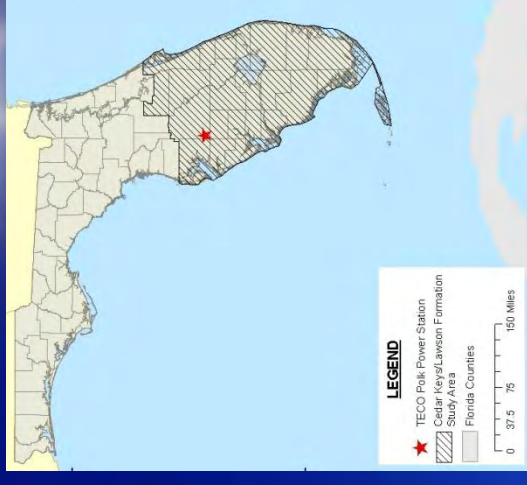


# Strategic Research Thrusts

- Overarching - Understanding Florida's Energy Systems
- Developing Florida's Biomass Resources
- Harnessing Florida's Solar Resources
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida - Nuclear and electric power workforce training, partnerships with industry in critical research needs, power systems, power electronics & conditioning, carbon sequestration
- Exploiting Florida's Ocean Energy Resources
- Securing our Energy Storage and Delivery Infrastructure
- Enhancing Energy Efficiency & Conservation

# Carbon Capture and Sequestration Projects

Geological Sequestration: Cedar  
Keys/Lawson Formation (deep  
saline aquifer



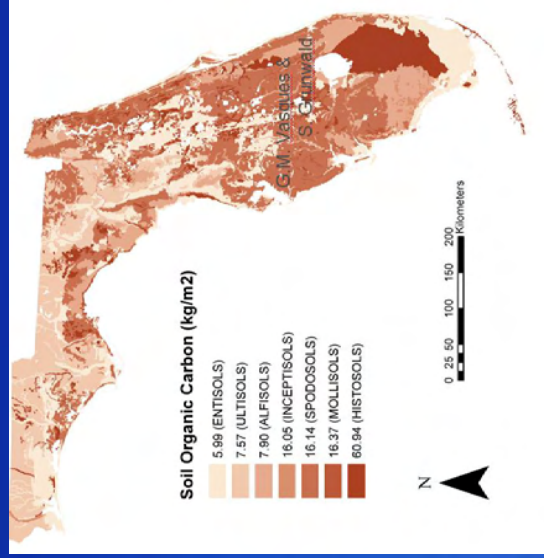
**Optimize:** Transportation,  
Energy Consumption, and  
Land Use

Total Soil Organic Carbon Stock

**2.26 giga ton**

FL CO<sub>2</sub> Production

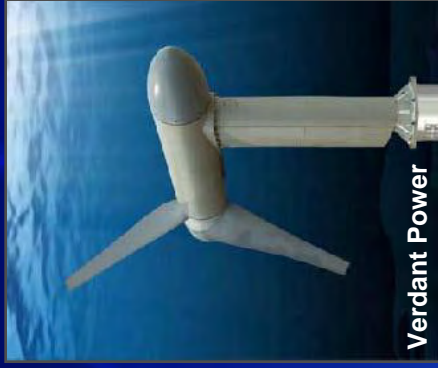
**0.26 giga ton/yr**



# Strategic Research Thrusts

- Overarching - Understanding Florida's Energy Systems
- Developing Florida's Biomass Resources
- Harnessing Florida's Solar Resources
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida
- Exploiting Florida's Ocean Energy Resources – Ocean and thermal differential energy harvesting
- Securing our Energy Storage and Delivery Infrastructure
- Enhancing Energy Efficiency & Conservation

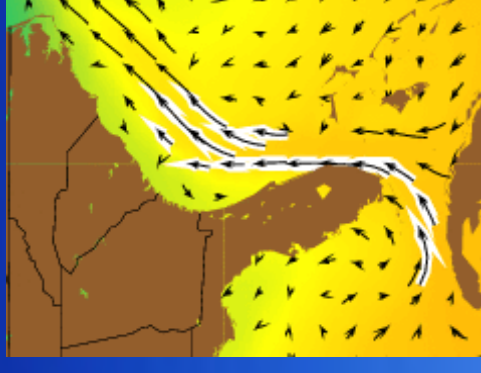
# Exploiting Florida's Ocean Energy Resources



- Harness ocean currents & thermal gradients
- Develop, fabricate & deploy 20 kW underwater turbine

## Deliverables

- 10-year program potential is as much as 5 GW of capacity generated from the Gulf Stream and up to 2 GW of equivalent cold-water-based AC
- Estimated 10,000 engineering / tech. jobs
- New high-tech Florida-based sector



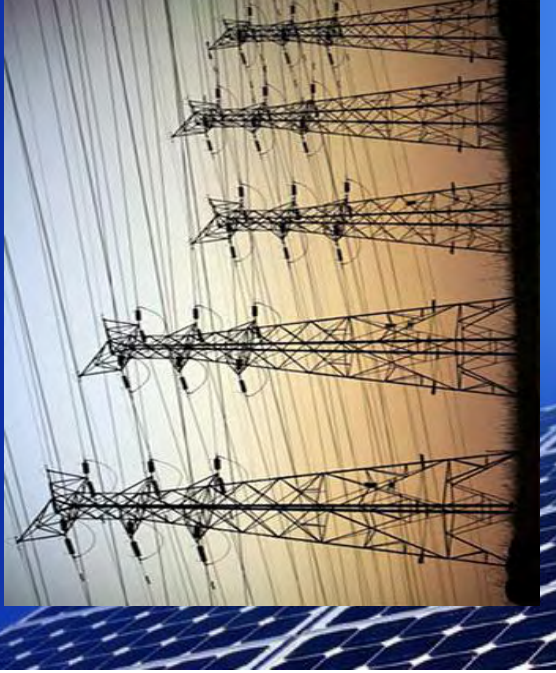
<http://oceancurrents.rsmas.miami.edu/>

# Strategic Research Thrusts

- Overarching - Understanding Florida's Energy Systems
- Developing Florida's Biomass Resources
- Harnessing Florida's Solar Resources
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida
- Exploiting Florida's Ocean Energy Resources
- Securing our Energy Storage and Delivery  
Infrastructure - Transmission & distribution, grid reliability and resiliency, continuous energy delivery, integrated renewable systems, customer owned microgrids, power quality, energy storage, location aware systems, and efficiency

# Securing Our Energy Storage & Delivery Infrastructure

- Batteries
- Smart Grids
- Energy Delivery Infrastructures
- Energy-Use Behavior



## Smart Grid Demonstration Project

- Combines RE with advanced battery system
- Implementation of a “Smart Grid” with advanced sensors, communication and control technologies.

# Strategic Research Thrusts

- Overarching - Understanding Florida's Energy Systems
- Developing Florida's Biomass Resources
- Harnessing Florida's Solar Resources
- Ensuring Nuclear Energy & Carbon Constrained Technologies for Electric Power in Florida
- Exploiting Florida's Ocean Energy Resources
- Securing our Energy Storage and Delivery Infrastructure
- **Enhancing Energy Efficiency & Conservation - Improvement of existing & new building efficiency, industry energy auditing & efficiency, outreach & education.**



# New Program Development

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- Provide exploratory research funding
  - More than 130 funding opportunities from various agencies distributed to faculty.
- Competitive Contracts & Grants: 11/1/08-9/30/09
  - 252 Applications with \$357M total request
  - 419 Awards in the amount: \$97M

## Major Proposal Examples:

- Participated in \$50M Algal Biofuels Consortium
- 36 White Papers developed for ARRA
- Current efforts: Hubs, Energy security, PV manufacturing

# Key Activities – Economic Development

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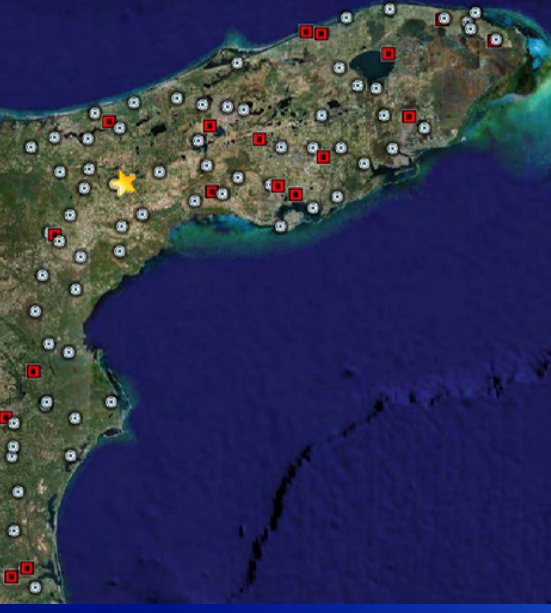
- Two Tiered Model
  - Early Stage Market Research / Business Plans – Funded 10 business plans or market research studies at \$10k each for FESC funded later stage technologies.
  - Matching Funds R&D Program – Up to \$50k / project for 5 later stage projects with a 2:1 industry match
- Industrial Database - currently at ~200 companies with stake in Florida's energy strategies
- Represent SUS in Business Development
  - SUS Technology Transfer Directors, FL Research Consortium, FL Institute for Commercialization of Public Research, FL High Tech Corridor, FL Incubator and Research Park Ecosystem

# Education – Focus on Workforce Development

- Three Focus Areas
  - Community College Training
    - AS degree
    - Certificate Program
  - Nuclear Engineering Education
  - Masters Level Education
- Close integration with Outreach and Industrial Collaboration
- Program implementation with Florida Advanced Technological Education Center (FLATE). Mission elements:
  - Create State-wide technician educational delivery system
  - Provide curriculum development, best practice demonstrations, student involvement and outreach activities necessary to meet the workforce capacity in target sectors



# Outreach – Focus on Energy Efficiency



- Targets the general public & built environment
- Utilizes Florida's extension education system and FESC partners
- Collaborates with the home builders and construction industry
- Create an online compendium of current, accurate publications
  - Developed a series of 15 fact sheets for the general public on energy efficiency.
- Develop / conduct technical & continuing education programs
- Partner with utilities to implement performance-based demand side management programs
- Work with "green" certification (FGBC, USGBC, GBI...)

# 2009 FESC Summit

- Held September 29-30, 2009, at the University of South Florida's Marshall Student Center.
- Over 160 attendees from academia, industry, government, and the private sector.
- Keynote address by Sam Baldwin (DOE EERE), "Energy Efficiency and Renewable Energy: Challenges and Opportunities."
  - Also featured invited presentations by Jim Murley (Chair, FECC) and Mark Futrell (PSC)
- Program included oral sessions, a poster session, technical team roundtable discussions, and focused on the following subject areas:
  - Energy Efficiency & Conservation, Education & Outreach, Policy
  - Biomass Resources, Carbon Capture
  - Ocean Energy Resources, Solar Resources
  - Energy Storage and Delivery, Smart Grid
  - Future Directions
- 2010 Summit is scheduled for September 28-29 at the University of Central Florida in Orlando.



# Messages

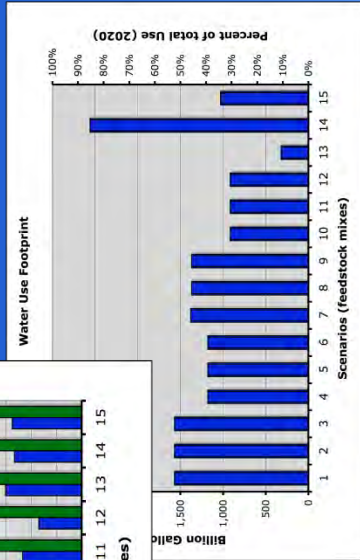
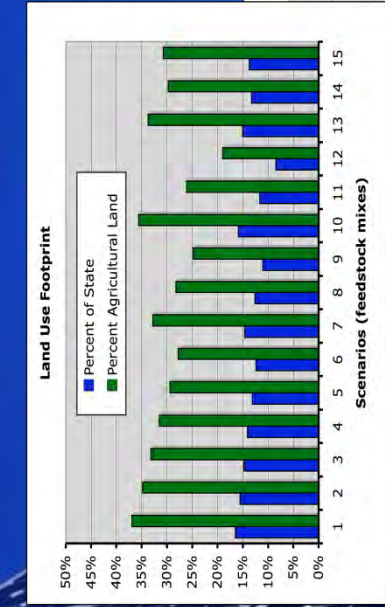
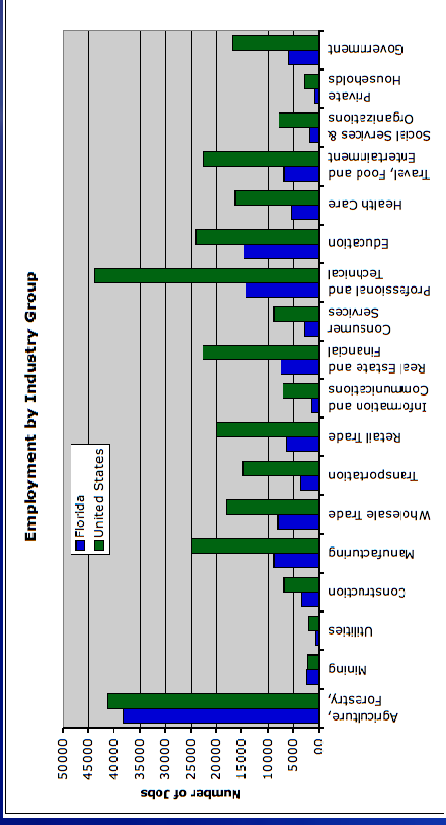
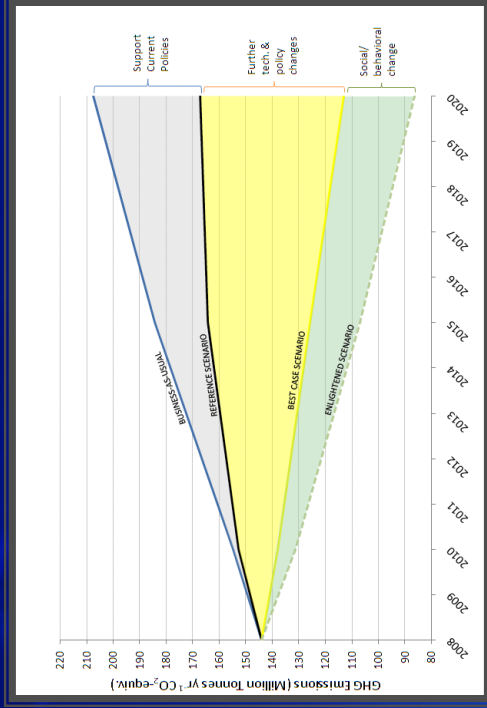
- FESC is doing very well
  - Your support is making a difference – thank you
- The Consortium is a key State resource for economic development
  - Systems approach connecting research to commercial product
  - Improving climate for attracting energy industry
    - Better prepared workforce
    - Accessible research enterprise
  - Facilitating technology transfer
  - Perform objective systems analysis

# Assessment of Greenhouse Gas Emissions for Selected Renewable Fuels

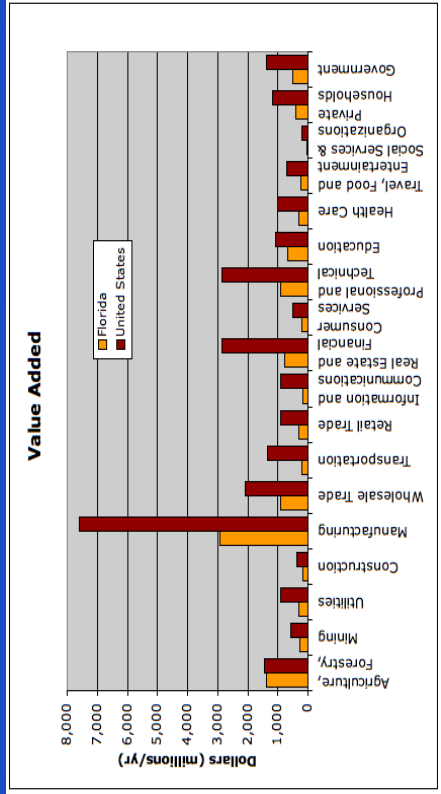
Prof. Mark Brown, Dept. Env. Eng. Sci. - UF

Total annual GHG emissions predicted: various scenarios of policy, technology, and social/behavioral changes

Employment generation from biofuel production to meet Florida's needs in 2020

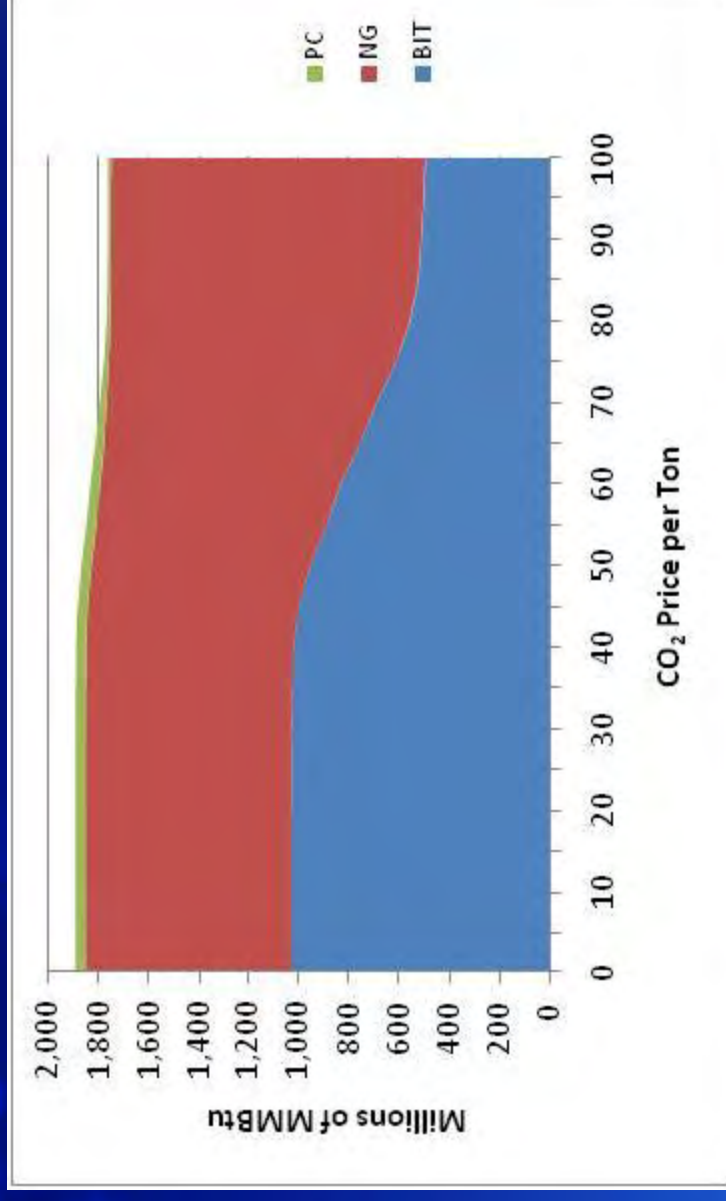


Value added resulting from biofuel production to meet Florida's needs in 2020



# The Marginal Effects of the Price for Carbon Dioxide: Quantifying the Effects on the Market for Electric Generation in Florida

Julie Harrington, FSU and Ted Kury, UF



- Emissions levels decrease at relatively low emissions prices
  - Petroleum coke and fuel oil displaced
- High carbon prices needed to displace coal by natural gas
- Results suggest that marginal effects of emissions prices vary greatly with emissions price level and market characteristics



# Web Site: [www.FloridaEnergy.ufl.edu](http://www.FloridaEnergy.ufl.edu)

The screenshot shows a Windows Internet Explorer browser window displaying the Florida Energy Systems Consortium (FESC) website. The browser's address bar shows the URL <http://www.floridaenergy.ufl.edu/>. The website header includes the FESC logo and the tagline "Universities Addressing Florida's Energy Needs". A navigation menu lists: Home, About Us, Florida Energy Facts, Energy Policy, Energy Research, Industry, Education, Public Outreach, and Publications. A central banner features a woman working on a circuit board. Below the banner, a "News & Events" section highlights a news item: "U.S. Requires New Nuclear Reactors to Withstand Plane Crashes" dated Feb. 17 (Bloomberg). A sidebar on the right lists member universities: UF Florida, USF, UCF, UNF, and UWF. The browser's taskbar at the bottom shows the Start button, several open applications (Microsoft PowerPoint, FECC, Creative MediaSo...), and the system tray with the time 12:42 AM.