



Macroeconomic Analysis, Florida Energy and Climate Change Action Plan: Report Summary

Analysis of the macroeconomic effects of *Florida's Energy and Climate Change Action Plan* indicates that implementation of recommendations by the *Governor's Energy and Climate Action Team*, on balance, would significantly benefit Florida's economy in the short and long term. Implementation of 28 climate, energy and economic policy recommendations would result in the following outcomes between 2009 and 2025:

- 148,000 net job gains, beginning immediately.
- \$38 billion net cumulative increase in Gross State Product (in Year 2000 dollars).
- \$28 billion net economic savings, primarily from new energy efficiency actions.
- Reduction of greenhouse gas emissions to 20 percent below 1990 levels by 2020, equal to 1.9 billion tons of greenhouse gas emissions.
- Net savings of 53.5 billion gallons of petroleum, 200.2 million short tons of coal, and 6.4 billion cubic feet of natural gas.

The *Florida Energy and Climate Action Plan* was completed in October 2008, after nearly a year of comprehensive fact finding, policy development and collaboration by more than 100 state-appointed Action Team volunteers representing a wide range of interests and expertise in the state. It resulted in development of a comprehensive portfolio of sector-based and economy-wide measures that would surpass the emissions reduction target set by Governor Charlie Crist by Executive Order in 2007.

Michael Sole, the Secretary of the Florida Department of Environmental Protection, chaired the Action Team process. Facilitative and technical assistance was provided by the Center for Climate Strategies (a nonpartisan, non-profit organization that has assisted 20 U.S. states with climate action plan development).

A macroeconomic analysis was conducted as a supplement to the Action Team recommendations, using the Regional Economic Modeling, Inc. (REMI) Policy Insight Model, by Dr. Adam Rose and Dr. Dan Wei of the University of Southern California, together with the REMI staff and in cooperation with the state of Florida. The REMI model has been extensively peer-reviewed and is the most widely used state-level economic modeling software package in the United States. Among its many other uses, the REMI Model has been applied successfully to forecast the impacts of changes in tax rates, the exit or entry of major businesses, and the impacts of energy and environmental policy actions by many states.

Almost half of the projected macroeconomic benefits in the study would be stimulated by adoption of a single policy measure – a Florida-specific Renewable Portfolio Standard (RPS). Calculations show that an RPS by itself would reduce 319 million tons of cumulative carbon dioxide and other greenhouse gas emissions by 2025 while contributing more than \$16 billion in

net new cumulative economic activity and creating almost 37,000 new jobs. Sensitivity analyses showed that the economic benefits of the RPS and solar energy production, in particular, remain high even if costs change up to fifty percent (in part because renewable energy is labor-intensive in comparison to conventional alternatives). Sensitivity analysis of other actions yielded similar findings.

Other measures that emerged from the study as economically beneficial include:

- Creation of new forests and restoration of previously forested lands in Florida would create more than \$8 billion of net new cumulative economic activity and 40,000 net new jobs, while reducing carbon emissions 210 million tons.
- Developing and expanding use of low-carbon renewable fuels in Florida would bring almost \$4 billion of net cumulative economic benefit and create more than 11,000 net new jobs, while reducing GHG emissions by more than 100 million tons.
- Promoting energy efficiency in existing residential buildings in Florida would bring \$3 billion in net cumulative economic benefit to the Florida economy and create almost 11,000 net new jobs, while reducing GHG emissions by 50 million tons.

The complete macroeconomic analysis considered 28 policy measures in *Florida's Energy and Climate Change Action Plan* that the Florida Action Team analyzed and quantified in terms of cost effectiveness and GHG reductions. In the course of development of microeconomic analysis for the policies, the analytical methods, data sources, and assumptions for each were reviewed, tested and subjected to formal consensus determinations by Florida stakeholders and technical work group members. In the end, all 50 recommendations, including the 28 quantified and analyzed in the study reported here, were adopted by unanimous vote of the Action Team. Some measures were not quantified based on limited need or lack of data for complete analysis.

The macroeconomic study affirms the Action Team's intention that their recommendations would benefit Florida's economy. As the Action Team identified, crafted and analyzed potential policy measures, it was guided by decision criteria that included emissions reduction potential, economic considerations, feasibility considerations, and energy impacts. The following statement from their report to the Governor articulates their focus on economic issues and performance:

"The Action Team completes its charge during a time of economic uncertainty. While it may be assumed by some readers that the current economic environment would hamper Florida's progress toward a low-carbon economy, the Action Team firmly believes that current economic conditions precisely sharpen the "call to action" first issued by Governor Crist in 2007. Now is the time for strategic investment in Florida's low-carbon energy infrastructure if we are to be successful in diversifying the state's economy, creating new job opportunities, and positioning Florida's "green tech" sector as an economic engine for growth."

Summary of Florida Climate and Energy Plan Recommended Policies

Note: Not all of Florida's 50 recommendations could be analyzed and quantified to estimate greenhouse gas (GHG) reductions or direct costs and cost-effectiveness. Therefore, there are gaps in the number sequence of the quantified recommendations listed in the Summary Table below. The Macroeconomic Analysis includes estimates of gross state product benefits (presented as net present value [NPV]) for 2009 to 2025 and employment impacts/benefits through 2025. In the table columns for Net Policy Cost, Cost Effectiveness and Gross State Product negative numbers indicate *costs savings*.

Summary Table. Florida's 28 Quantified Policy Recommendations: GHG Reductions, Net Cost, Cost Effectiveness, Gross State Product and Employment Benefits

FL Policy No.	Name of Policy Recommendation	Total 2009–2025 GHG Reductions (MMtCO ₂ e)	Net Policy Cost NPV 2009–2025 (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	GSP Benefit NPV 2009–2025 (Million\$)	Employment Benefit 2025 (1,000s FTE)
Energy Supply and Demand (ESD)						
ESD-5	Renewable Portfolio Standard (RPS), incentives and barrier removal (RPS of 20% by 2020)	319	–\$9,274	–\$29	\$16.22	36.710
ESD-6	Nuclear Power	49.4	\$1,782	\$36	–\$2.48	–7.130
ESD-8	Combined Heat and Power (CHP) Systems	26.5	\$126	\$5	–\$4.21	–11.590
ESD-9	Power Plant Efficiency Improvements	111.4	–\$1,541	–\$14	\$1.70	3.569
ESD-11	Landfill Gas-To-Energy (LFGTE)	64.7	\$79	\$1	\$0.04	0.240
ESD-12	Demand-Side Management (DSM)/Electric Energy Efficiency Programs, Funds, or Goals	201.4	–\$8,566	–\$43	\$2.40	8.666
ESD-13a	Energy Efficiency in Existing Residential Buildings	50.4	–\$1,432	–\$28	\$3.08	10.920
ESD-14	Improved Building Codes for Energy Efficiency including HB 697 and Executive Order 127	146.4	–\$4,347	–\$30	\$0.46	–0.301

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Transportation and Land Use (TLU)						
TLU-1	Develop and Expand Low-GHG Fuels	106.41	–\$15,161	–\$142	\$3.83	11.290
TLU-2	Low Rolling Resistance Tires and Other Add-On Technologies	13.99	–\$1,259	–\$90	\$0.16	0.370
TLU-4	Improving Transportation System Management (TSM)	63.91	–\$5,106	–\$80	–\$1.87	–6.701
TLU-8	Increasing Freight Movement Efficiencies	11.52	\$21	\$2	\$0.81	2.283
Agriculture, Forestry and Waste Management (AFW)						
AFW-1	Forest Retention—Reduced Conversion of Forested to Non-Forested Land Uses	7.2	\$186	\$26	\$0.00	0.308
AFW-2	Afforestation and Restoration of Non-Forested Lands				\$8.04	40.000
	A-1. Afforestation	28	\$134	\$5		
	A-2. Reforestation	104	\$555	\$5		
	B. Urban Forestry	78	\$759	\$10		
AFW-3	Manage Forests for Carbon Sequestration				–\$0.01	0.279
	A. Pine Plantation Management	7.9	\$84	\$11		
	B. Non-Federal Public Land Management	3.9	\$41	\$11		
AFW-4	Expanded Use of AFW Biomass Feedstocks for Electricity, Heat, and Steam Production	361	\$7,432	\$21	–\$0.71	20.470
AFW-5	Promotion of Farming Practices That Achieve GHG Benefits				\$0.05	0.142
	A. Soil Carbon Management	8	–\$74	–\$9		
	C. Nutrient Management	2.6	\$68	\$26		

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AFW-6	Reduce Conversion Rate of Agricultural Land and Open Green Space to Development	4.2	\$394	\$93	\$0.26	5.133
AFW-7	In-State Production of Liquid/Gaseous Biofuels	68	–\$532	–\$8	\$4.07	7.447
AFW-8	Promotion of Advanced Municipal Solid Waste Management Technologies (Including Bioreactor Technology)	34	\$294	\$9	\$0.23	0.645
AFW-9	Improved Commercialization of Biomass-to-Energy Conversion and Bio-Products Technologies				\$1.22	6.440
	A. Manure Digestion/Other Waste Energy Utilization	0.8	–\$13	–\$17		
	B. WWTP Biosolids Energy Production & Other Biomass Conversion Technologies	42	\$1,848	\$44		
	C. Bio-Products Technologies and Use	2.6	–\$161	–\$62		
Summation Total*		1,917	–\$33,663	–\$17.56	\$33.31	129.210
Simultaneous Total		1,548	–\$28,569	–\$18.46	\$37.90	148.300

FL = Florida; GHG = greenhouse gas; MMtCO₂e = million metric tons of carbon dioxide equivalent; NPV = net present value; \$/tCO₂e = dollars per metric ton of carbon dioxide equivalent; GSP = gross state product; FTE = full-time equivalent; HB = House bill; WWTP = wastewater treatment plant; ESD = energy supply and demand; TLU = transportation and land use; AFW = agriculture, forestry and waste management.

NOTE: In the Net Policy cost, Cost Effectiveness and Gross State Product columns, negative numbers indicate cost savings.