



Governor’s Action Team on Energy and Climate Change
State of Florida

www.flclimatechange.us

Agriculture, Forestry, and Waste Management (AFW) Technical Work Group
Summary List of Draft Priority Policy Options for Analysis

Draft Option #	Draft Policy Option Name	Straw Proposal Volunteers
AFW-1	Forest Retention – Reduced Conversion of Forested to Non-Forested Land Uses	Nick Wiley Doria Gordon - alternate
AFW-2	Afforestation and/or Restoration of Non-forested Lands a. Forest Landscape b. Urban Forestry	Nick Wiley – Forest Landscape Celeste White – Urban Forestry
AFW-3	Forest Management for Carbon Sequestration	Mike Branch
AFW-4	Expanded Use of Forestry, Agriculture and Waste Management Biomass Feedstocks for Electricity, Heat and Steam Production a. Long-Rotation Forests b. Short-Rotation Forests c. Other Energy Crops d. MSW Biomass e. Agriculture and Forestry Residues	Gary Peter – a, b, e (forestry) c - TBD David McConnell – d Andrew Walmsley – e (ag)
AFW-5	Promotion of Farming Practices that Achieve GHG Benefits a. Soil Carbon Management b. Land Use Management that Promotes Permanent Cover c. Nutrient Management d. Improved Harvesting Methods to Achieve GHG Benefits	Andrew Walmsley
AFW-6	Reduce the Rate of Agricultural Land and Open Green Space Conversion to Development	Jay Levenstein

Draft Option #	Draft Policy Option Name	Straw Proposal Volunteers
AFW-7	In-State Liquid/Gaseous Biofuels Production <ul style="list-style-type: none"> a. Long-Rotation Forests b. Short-Rotation Forests c. Other Energy Crops d. MSW Biomass e. Agriculture and Forestry Residues 	Gary Peter – a, b, e (forestry) c - TBD David McConnell – d Andrew Walmsley – e (ag)
AFW-8	Promotion of Advanced Municipal Solid Waste Management Technologies (including Bioreactor Technology)	Marc Bruner David McConnell - alternate
AFW-9	Improved Commercialization of Biomass to Energy Conversion & Bio-Products Technologies <ul style="list-style-type: none"> a. Manure Digestion/Other Waste Energy Utilization b. WWTP Biosolids Energy Production c. Other Biomass Conversion Technologies d. Bio-Products Technologies & Use 	Andrew Walmsley – a DEP and Kevin Robertson – b c – TBD d – TBD
AFW-10	Programs to Support Local Farming/Buy Local	Jay Levenstein

Table 1. Florida Climate Action Team policies: biomass supply and demand assessment

Biomass Resource	Annual Biomass Supply (dry tons)	Notes
Logging Residue	1,300,000	Source: <i>Florida Biomass and Bioenergy Overview</i> , Southeastern Sun Grant Initiative, May 2007.
Urban Wood Waste	4,600,000	Source: <i>Florida Biomass and Bioenergy Overview</i> , Southeastern Sun Grant Initiative, May 2007.
Primary Mill Residue (Unused)	4,000	2005 NREL Report. Derived from the USDA Forest Service's <u>Timber Product Output database for 2002</u> , includes mill residues burned as waste or landfilled.
Agricultural Residue	3,597,000	2005 NREL Report. Estimated using 2002 total grain production, crop to residue ratio, moisture content, and taking into consideration the amount of residue left on the field for soil protection, grazing, and other agricultural activities.
Switchgrass		2005 NREL Report estimates a potential 507,000 tons of switchgrass could be grown on CRP lands.
Willow and Hybrid Poplar		2005 NREL Report estimates a potential 389,000 tons of willow or hybrid poplar could be grown on CRP lands.
Other Woody Energy Crops		Potential to grow 2,080,000 tons on marginal mining lands. Estimated based on 160,000 acres (from Southeastern Regional Biomass Energy Program 2003 Annual Report ¹) and 13 dry tons/acre. ²
Poultry Litter		
Municipal Solid Waste (MSW) Fiber		
Wood Pulp		
Yard & Landscape Waste Debris		
Total Annual Biomass Supply		
Policy Requiring Biomass	Annual Biomass Demand (dry tons)	Notes

¹3rd Year Field Operations & Maintenance Support for Central Florida Short Rotation Woody Crop (SRWC) Tree Farm. Southeastern Regional Biomass Energy Program, October, 2003.

² Midpoint between high (16 dry tons/acre) and low (10 dry tons/acre) estimates from University of Florida, <http://www.treepower.org/yields/main.html>.

Biomass Resource	Annual Biomass Supply (dry tons)	Notes

Draft Policy Option Template

AFW-1 Forest Retention – Reduced Conversion of Forested to Non-Forested Land Uses

Policy Description

Florida has one of the highest growth rates in the nation. It is projected that by 2060, approximately 7 million acres of additional land will be converted from rural to urban uses in Florida, including almost 2.7 million acres of current agricultural lands and 2.7 million acres of existing habitat. This growth will create enormous pressure to develop the landscape. Developed areas contain lower amounts of biomass and its associated carbon. Developed areas also sequester less carbon dioxide than forested areas.

Furthermore, when landowners don't have incentive to retain ownership, they often not only sell for development, but also sell a forested tract by smaller parcels making effective forest management impractical. Managed stands sequester carbon faster than non-managed stands and sequester carbon long-term in durable products.

This policy seeks to reduce the rate at which existing forests are cleared, fragmented and converted to developed uses while also providing mechanisms that ensure healthy forest management. Much of the carbon stored in forest biomass and soils can be lost as a result of such a land-use conversion. There are a variety of conservation programs, both public and private, which can be used to halt this landscape conversion. This policy will emphasize the value of existing forest cover and their importance as carbon stocks.

Policy Design

Goals: TBD

Stabilize current statewide forest cover acres and achieve no net loss in carbon stocks by 2015.

Decrease conversion of forestland to non-forest uses/cover.

Increase carbon stocks by 2025 through reforestation and fully-stocking forestlands (see AFW – 2).

- **Other:** See above.
- **Parties Involved:** Florida private forest landowners, FL Division of Forestry, FL Forestry Association, FL Fish and Wildlife Conservation Commission, University of Florida IFAS extension, Natural Resources Conservation Service, Non Governmental Agencies, Regional Planning Councils, other state land management agencies, U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Army Corp of Engineers, other federal land management and technical

assistance agencies, The Nature Conservancy, forest industry, REITs, TIMOs, and private landowners, State Government, U.S. Federal Government

Other: (from Dept of Forestry, in blue) Based on the U.S. Forest Service Forest Inventory Analysis data, Florida lost 74.3 thousand acres of forest land (16,221.2 to 16,146.9 million acres), resulting in a 0.5% forest land lost from 1995 to 2005. During the same time period, the timberland (forest land capable of producing merchantable timber) acreage increased by 901.2 thousand acres (14,650.7 to 15,551.9 million acres), which corresponds to a 6.2% increase over a 10-year period. However, that does not mean that forest land conversion is not occurring in Florida. It means that for this period of time acreage was planted with trees offsetting almost all of the forest land converted to other land uses throughout the state, and that some of the acreage previously classified as forest land is now classified as timberland.

Implementation Mechanisms

Achieve “no net loss” or an increase in forest carbon stocks through local land use planning, conservation easements, federal and state incentive programs available to family forest landowners, outreach, favorable tax incentives and disincentives, and other relevant forest retention mechanisms (eg. Carbon trading).

Provide technical and material assistance to forest land owners to encourage them to keep forest land in forest cover. This can be accomplished by maintaining and whenever possible increasing ongoing forestry assistance programs. Current forest assistance programs are listed below:

- Forest Stewardship Program** – Provides resource management plans and technical guidance to encourage multiple use management of private lands. Multiple use includes production of a variety of forest products, improved wildlife habitat, increased recreational opportunities, improved aesthetics, and cleaner air and water. This program is partially funded by federal dollars that are expected to continue to decline.
- Conservation Reserve Program** – Provides incentives to reduce soil erosion and protect water quality by returning lower quality farm ground to forest cover. This program is federally funded with DOF foresters providing technical guidance of reforestation practices.
- Environmental Quality Incentive Program** - Provides incentives to reduce soil erosion and protect water quality through a wide variety of practices. This program is federally funded with DOF foresters providing technical guidance for reforestation and forest productivity enhancement practices. The pending farm bill includes language to increase the emphasis on forestry practices. Support is required to insure that the forestry language remains a priority and a new Farm Bill is passed.
- Forest Land Enhancement Program** – Provided federal cost share dollars to private landowners to improve current forest condition, and assistance in reforestation. These practices reduced threats from wildfire, insects and disease while increasing forest productivity. This program has expired and is not likely to receive federal funding in the future.
- Cooperative Forestry Assistance** – County foresters are available to assist landowners in forest management planning. County foresters provide technical guidance on how to improve and protect forest health and productivity.

- 🌲 **Forest Health, Southern Pine Beetle Program** – The DOF offers technical and financial assistance to landowners to reduce risks associated with insect and disease problems. This program is partially funded with federal dollars.
- 🌲 **Urban and Community Forests** – Provides federal dollars to encourage cities to develop tree planting and maintenance programs. Urban trees reduce heat build up in cities, reduce energy consumption for cooling by providing shade, cleaning air, producing oxygen, improving aesthetics, and storing carbon. Blocks of trees near cities can serve many of the above functions as well as providing: recreational areas, storm water retention and filtration, ground water recharge, reduced water treatment costs, increased water supply, etc.

Related Policies/Programs in Place

Florida has aggressively pursued the acquisition of conservation lands over the past 25 years preserving more than 2 million acres with more than \$6 billion in funding for the Preservation 2000 program and its successor, the Florida Forever program.

The Natural Resources Conservation Service's Farm Bill programs (CRP, GRP, WHIP, EQIP) provides financial incentive to landowners to maintain forest lands.

The U.S. Fish and Wildlife Service's Partners for Fish and Wildlife supports restoration and conservation of high priority habitats by forming partnerships with private landowners.

The Fish and Wildlife Commission's Landowner Assistance Program provides habitat management recommendations aimed at forming long-term partnerships with private landowners that lead to the restoration and conservation of high priority habitats, identified in Florida's Wildlife Action Plan <http://myfwc.com/wildlifelegacy/>. Recommendations include restoring native groundcover, overstory species, planting new pine stands at low densities, and thinning existing stands to benefit carbon sequestration, wildlife habitats, and forest health.

FL Farm Bureau's Carbon Trading program is now in effect and offers incentive to financial incentive to landowners for maintaining forest lands.

Amendment 4 would provide additional tax incentives to landowners who retire development rights through a conservation easement.

In 2006, Florida had 16.7 million acres of forest land of which nearly 16.0 millions acres were classified as timberland (capable of producing merchantable timber). The Florida Division of Forestry (DOF) manages 1.0 million acres of forest land on 34 state forests, and provides technical assistance to other state and local agencies which manage an additional 1.9 million acres of forest land. Through various other programs (see below) DOF provides technical assistance to individual and family landowners who control nearly 5 million acres of Florida's forest lands. Federal forest lands constitute 2.1 million acres, forest industry owns 1.6 million acres, non-industrial private forests in corporate ownership constitute nearly 5 million acres, and other ownership equals 0.1 million acres of forest lands in Florida.

Besides managing state forests, DOF is working with family and individual forest landowners, who control 5 million acres (30%) of Florida’s forest lands, to advocate forest management aimed at well stocked forests for the duration of a rotation from tree planting to final harvest. Well stocked forests have a basal area of 60 to 80 sq ft per acre. When forests reach a merchantable basal area of approximately 100 to 150 sq ft per acre, they are thinned back to the 60 to 80 sq ft range to sustain optimal tree growth and forest health. After final harvest, pine forests should be replanted at a minimum of 605 or 726 trees per acre to assure adequate survival, tree growth, tree form, and subsequently timber quality and quantity. Planting at the recommended densities provides an opportunity for thinning in the middle of a 25 to 30 year rotation making wood available for energy production or traditional forest products. More trees at planting and adequate forest stocking means more CO₂ sequestered by rapidly growing young trees and more opportunities for woody biomass harvest for energy production and other uses.

Types(s) of GHG Reductions

Avoided CO₂ emissions in case of retained forests

When forests are harvested and not replanted most of the biomass is converted back to CO₂. For some long lived products it takes decades to revert back to CO₂, but for other like paper and packaging materials the “decaying” process can be measured in months or years. Therefore, whenever the forest is retained “on the stump” the CO₂ emissions are avoided.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Draft Policy Option Template

AFW-2 Afforestation and/or Restoration of Non-forested Lands

Policy Description

Establish forests on land that has not historically been forested (e.g., agricultural land; “afforestation”). Promote forest cover and associated carbon stocks by regenerating lands previously forested (“reforestation”). In addition, implement practices such as soil preparation, erosion control, and stand stocking to ensure conditions that support forest growth. Additional benefits include public recreation, water quality, wildlife habitat, and enhanced biodiversity.

Encourage management activities that promote forest productivity and increase the amount of carbon sequestered in forest biomass and soils and in long-lived wood products. Practices may include thinning and density management, prescribed burning and risk reduction, and management of insects and disease. Reduce the severity of wildfires to reduce GHG emissions by lowering the forest carbon lost during a fire and by maintaining carbon sequestration potential. Similarly, reducing damage from insects, disease, and invasive plants reduces GHG emissions by maintaining the carbon sequestration potential of healthy forests.

Maintain and improve the health and longevity of trees in urban and residential areas to protect and enhance the carbon stored in tree biomass. Indirect emissions reductions may also occur by reducing heating and cooling needs as a result of planting shade trees. Promote use of software programs that can be used by cities and communities to track urban forestry. Need to be sensitive to greenbelt taxing issues.

Maintain and improve the health and longevity of the tree canopy cover in urban and residential areas. Potential benefits include protection and enhancement of the carbon stored in tree biomass; absorption of air pollutants and increased oxygen supplies; and reduced heating and cooling needs. Promote use of software programs that cities and communities can use to assess the ecological and economic benefits that their urban trees provide.

Policy Design

Goals: TBD

Increase the area of forested lands in FL by 2.5% annually through 2025 through reforestation and/or afforestation.

Plant and maintain enough trees in urban areas to offset 2008 metropolitan carbon emissions by 10% by 2025.

Increase the tree canopy coverage in all developed areas [population >500 residents per square mile] to 30% by 2025.

- **Timing:** See above

- **Parties Involved:** Florida private forest landowners, FL Division of Forestry, FL Forestry Association, FL Fish and Wildlife Conservation Commission, University of Florida IFAS extension, Natural Resources Conservation Service, Non Governmental Agencies, Regional Planning Councils, other state land management agencies, U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Army Corp of Engineers, other federal land management and technical assistance agencies, The Nature Conservancy, forest industry, REITs, TIMOs, and private landowners, State Government, U.S. Federal Government

- **Other:**

The amount of Green House Gas (GHG) reduction by Florida’s forests could be increased by intensifying reforestation and afforestation efforts in the state. According to 2006 data, approximately 152,000 acres are reforested annually in Florida by deliberate efforts, and an additional 34,000 acres are reforested annually by naturally occurring forest self-regeneration. The total of 186,000 acres reforested and afforested annually represent 1.2% of all forest lands in Florida. Both artificial reforestation (planting trees after final forest harvest) and afforestation (planting trees on agricultural and other lands) should be performed to establish adequate tree densities. Pine forests should be planted at a minimum of 605 or 726 trees per acre to assure adequate survival, tree growth, tree form and subsequent timber quality and quantity. Rapidly growing young pine trees sequester large quantities of CO₂; while stands that are not adequately stocked provide only a fraction of potential GHG reduction and woody biomass production for renewable energy production and other uses.

Establish a baseline for urban forest carbon storage and sequestration rates in Florida’s top 10 metropolitan areas (based upon population). By quantifying carbon storage and sequestration rates in these areas we will then be able to establish appropriate long term goals to determine number of trees required to offset carbon emission and reduce energy consumption in urban areas. Currently in Tampa, the urban forest only offsets approximately 1% of carbon emissions associated with human activity. A goal should be set that for urban forests to offset carbon emission at the 2008 population levels by 10% by 2025.

Increased tree canopy coverage can be accomplished by a combination of tree planting projects, delineating natural areas in new developments, preservation of suitable specimen and groups of specimen trees on parcels during development, and adequate care of existing trees in developed areas.

Implementation Mechanisms

Landowner assistance and/or incentive programs are needed to encourage reforestation and afforestation in Florida.

Related Policies/Programs in Place

The Natural Resources Conservation Service’s Farm Bill programs (CRP, GRP, WHIP, EQIP) support reforestation.

The U.S. Fish and Wildlife Service’s Partners for Fish and Wildlife supports reforestation of high priority habitats.

The Fish and Wildlife Commission’s Landowner Assistance Program provides habitat management recommendations aimed at forming long-term partnerships with private landowners that lead to the restoration and conservation of high priority habitats, identified in Florida’s Wildlife Action Plan <http://myfwc.com/wildlifelegacy/>. Recommendations include restoring native groundcover, overstory species, planting new pine stands at low densities, and thinning existing stands to benefit carbon sequestration, wildlife habitats, and forest health.

The Urban and Community Forestry Program in DACS helps promote urban forestry and provides grants. City Green and I-Tree are programs that cities and communities can use to measure urban trees.

DOF is working with family and individual forest landowners, who control 5 million acres (30%) of Florida’s forest lands, to advocate forest management aimed at well stocked forests for the duration of a rotation from tree planting to final harvest. Well stocked forests have a basal area of 60 to 80 sq ft per acre. When forests reach a merchantable basal area of approximately 100 to 150 sq ft per acre, they are thinned back to the 60 to 80 sq ft range to sustain optimal tree growth and forest health. After final harvest, pine forests should be replanted at a minimum of 605 or 726 trees per acre to assure adequate survival, tree growth, tree form, and subsequently timber quality and quantity. Planting at the recommended densities provides an opportunity for thinning in the middle of a 25 to 30 year rotation making wood available for energy production or traditional forest products. More trees at planting and adequate forest stocking means more CO₂ sequestered by rapidly growing young trees and more opportunities for woody biomass harvest for energy production and other uses.

Types(s) of GHG Reductions

Additional sequestered CO₂ by rapidly growing trees on afforested/reforested acres representing 1.3% of forestland, which is above and beyond “business as usual” represented by 1.2% of reforestation/afforestation in 2006, for a grand total of 2.5% of new forestland.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Draft Policy Option Template

AFW-3 Forest Management for Carbon Sequestration

Policy Description

Forest management activities that promote forest productivity and increase the rate of carbon dioxide sequestration in forest biomass and soils and in harvested wood products. Practices may include increased stocking of poorly stocked lands, age extension of managed stands, thinning and density management, fertilization and waste recycling, expansion of short-rotation woody crops (for fiber and energy), expanded use of genetically preferred species, modified biomass removal practices, fire management and risk reduction, and pest and disease management. This option can also cover improvements to silvicultural practices that result in net GHG benefits (potentially including water conservation, harvesting techniques, and nutrient application).

Policy Design

Goals: TBD

Practice improved forest management for carbon sequestration on XX% of FL forestland by 2025.

- **Timing:**
- **Parties Involved:**
- **Other:**

Implementation Mechanisms

TBD

Related Policies/Programs in Place

For silviculture, BMPs developed by DACS, DEP, and IFAS related to water quality protection and water conservation. Note: Florida currently has very high compliance with BMPs.

The Fish and Wildlife Commission's Landowner Assistance Program provides wildlife-related habitat management recommendations towards long-term partnerships with private landowners that lead to the restoration and conservation of high priority habitats, identified in Florida's Wildlife Action Plan <http://myfwc.com/wildlifelegacy/>. Recommendations include restoring native groundcover, overstory species, planting new pine stands at low densities, and thinning existing stands to benefit carbon sequestration, wildlife habitats, and forest health.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Draft Policy Option Template

AFW-4 Expanded Use of Forestry, Agriculture, and Waste Management Biomass Feedstocks for Electricity, Heat, and Steam Production

Policy Description

Increase the amount of biomass available from agriculture, forestry, and municipal solid waste (MSW) for generating electricity and displacing the use of fossil energy sources. Local electricity or steam production yields greatest net energy payoff. This biomass should be used in an environmentally acceptable manner considering proper facility siting and feedstock use. (e.g., proximity of users to biomass, impact on water supply and quality, control of air emissions, solid waste management, cropping management, nutrient management, soil and non-soil carbon management, and impact on biodiversity and wildlife habitat). The objective is to create concurrent reduction of carbon dioxide due to displacement of fossil fuel considering life cycle GHG emissions associated with viable collection, hauling, energy conversion, and energy distribution systems.

Issue long term sustainable supply of reasonable cost biomass for generating electricity, heat and steam. Promote enhanced growth of long rotation, short rotation and dedicated energy crops as well as collection of biomass residues.

Provide incentives that will result in an increase in the use of waste-to-energy and other waste-based energy technologies and the recovery of landfill methane gas. These technologies make a two-fold contribution to climate protection: the discharge of methane and other greenhouse gases into the atmosphere is reduced, and the burning of fossil fuels is replaced with recovered energy.

Policy Design

Goals: TBD

Increase the current generation of renewable energy from biomass feedstocks by 500% by 2025.

By 2025 sugar cane, sweet sorghum and other potential energy crops should increase by 10%. The acres of land producing ecological sustainable energy crops are to increase up to an additional 300,000 acres by 2025.

Increase the current generation of renewable energy from waste-to-energy facilities by 20% by 2025.

Increase the number of uncontrolled municipal solid waste landfills recovering methane as an energy source, such that 50% of the landfill gas generated is controlled by 2020.

- **Timing:**
- **Parties Involved:** Municipal and county governments, private solid waste management companies, local economic development agencies, Florida Department Environmental Protection, The Florida Energy Commission, non-government organizations, public interest

groups, Public Service Commission, private and public landowners, electrical utilities, Florida Department of Forestry, Florida Department of Agriculture, water management districts

- **Other:** Note also the strong linkage to the energy supply sector, since waste to energy plants are active in the state. Note: Also may consider new technologies such as plasma arc.

Consider the following feedstock sources:

- a. Long-Rotation Forests – Need to promote the use of precommercial thinnings and nonmerchantable wood from overstocked lands for electricity, steam and heat in Florida by providing subsidies, tax credits or payment schemes that enable landowners to conduct proper thinning and removals that benefit the health of the forest and decrease the chances of catastrophic wild fire. Promote the development of biomass utilizing facilities in appropriate locations that contain sufficient biomass but don't already contain commercial conversion facilities by providing infrastructure needed to support the development and transport of woody biomass. Promote development and deployment of advanced forest management practices, e.g., faster growing genetic stock with improved wood properties for conversion to electricity, steam and heat; that sustainably increases yields of biomass across the rotation.
- b. Short-Rotation Forests – Need to promote the development and commercial deployment of select dedicated forest tree species in Florida by providing: Possibilities include 1) establish guarantees or provide subsidies for converting land near enough to facilities to short rotation forests, providing low cost loans to first time growers (overcome initial lack of cash flow), 2) landowner technical assistance programs, 3) promote stable and efficient markets for wood and residues from short rotation forests by creation of incentives for producing electricity, steam and heat from this source of biomass, 4) create opportunities for conversion facility owners to partner with existing land owners to establish long-term supply agreements, 5) development equipment and methods that can efficiently harvest and transport stems and residues to facilities that produce electricity, steam and heat, 6)
- c. Other Energy Crops
- d. MSW Biomass
- e. Agriculture and Forestry Residues – Promote the use of forest residues by developing the technical means and improving the financial returns that make use of these residues commercially viable. Possibilities include: promoting research into harvesting, collection and compaction for transportation, subsidies that promote their use at conversion facilities.

E-grass also has the potential to be a crop that could produce clean energy for production.

Out of approximately 200 open and closed landfills in the state, only about 13 sites are currently recovering landfill methane for energy use, and currently 11 waste-to-energy plants operating in Florida, generating 513 megawatts of electricity.

Overall, policies need to decrease the risk and uncertainties associated with having sustainable supplies of good quality biomass at reasonable costs for the planned life time of the electrical, heat and/or steam producing facility. It is likely that a wide array of policies will be needed that influence both the land and conversion facility owners to dedicate themselves to using biomass feedstocks to produce renewable power.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Executive Order (EO) 07-127 includes a request to the Public Service Commission (PSC) to establish a renewable portfolio standard (RPS) that would require utilities to obtain 20% of generation from renewable sources. Presumably this would create demand for biomass feedstocks.

Florida Division of Forestry promotes the development of woody biomass.

Existing statutory prohibitions promote the separate collection of yard waste biomass.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Sample Draft Policy Option Template

AFW-5 Promotion of Farming Practices that Achieve GHG Benefits

Policy Description

The amount of carbon stored in the soil can be increased by the adoption of practices such as conservation, no-till cultivation, and crop rotation. Provide incentives to farmers for using production practices that achieve net GHG benefits such as no-till cultivation or biotech crops requiring reduced chemical/fuel use. Other benefits include reduced wind and water erosion, reduced fuel consumption, and improved wildlife habitat.

Convert marginal agricultural land used for annual crops to permanent cover—such as grassland/rangeland, grove, or forest—where the soil carbon and/or carbon in biomass is higher under the new land use. Provide incentives to producers to prevent grassland from returning either to conventionally tilled production or to suburban/urban development.

Improve the efficiency of fertilizer use and other nitrogen-based soil amendments through implementation of FDACS Best Management Practices (BMPs) manuals and support of biotech crops. Excess nitrogen not metabolized by plants can leach into groundwater and/or be emitted to the atmosphere as N₂O. Better nutrient utilization can lead to lower nitrous oxide emissions from runoff.

Policy Design

Goals:

Soil Carbon Management - By 2025, implement cultivation practices to enhance soil carbon levels on 40% of the acreage that is not already using these practices.

Agriculture Land Conversion- By 2025, convert XX acres of marginal agricultural land to higher sequestration permanent cover.

Nutrient Management—Increase efficiency of fertilizer use by 25% in 2025, compared to business as usual.

- **Timing:**
- **Parties Involved:** University of Florida-IFAS, Florida Farm Bureau, all commodity groups, Florida Department of Agriculture and Consumer Services, United States Department of Agriculture-NRCS, Florida Department of Environmental Protection
- **Other:** *Consider the following categories:*
 - a. *Soil Carbon Management*
 - b. *Land Use Management that Promotes Permanent Cover*

c. Nutrient Management

d. Improved Harvesting Methods to Achieve GHG Benefits

Voluntary, incentive-based programs are preferred over command and control regulation.

Also water quality/quantity, economics and other environmental benefits need to be taken into consideration when adopting certain practices.

Research, Extension, Technology, and Biotechnology must be embraced for increased yields and improved harvesting techniques.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Sample Draft Policy Option Template

AFW-6 Forest Retention – Reduced Rate of Agricultural Land and Open Green Space Conversion to Development

Policy Description

Reduce the rate at which agricultural lands and open green space are converted to developed uses, while protecting private property rights and responsibilities. This retains the above- and belowground carbon on these lands, as well as their carbon sequestration potential. Transportation emissions will be reduced indirectly through more efficient development and lower vehicle use. Agricultural land and open green space conversion may be prevented through fee title acquisitions or conservation easements.

Policy Design

Goals: Reduce the rate at which agricultural lands and open green spaces are converted to development by protecting one acre of agricultural land or open green space for each acre lost to development: a 50% reduction in the level of losses that would otherwise occur.

- **Timing:** Ongoing.
- **Parties Involved:** FDACS, USDA, FDEP, FWCC, FDCA, WMDs, Local Governments, NGOs (*need to spell out*)
- **Other:**

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Sample Draft Policy Option Template

AFW-7 In-State Liquid/Gaseous Biofuels Production

Policy Description

Increase production of ethanol and/or biodiesel fuel from agriculture and/or forestry feedstocks and/or municipal solid and other waste (raw materials) to displace the use of fossil fuel. Promote the development of cellulosic ethanol technologies and ethanol production systems that use renewable fuels to improve the embedded energy content of ethanol. Increased production and consumption in-state gives the highest benefits.

Increase production of ethanol, biodiesel fuel and transportation fuel (compressed natural gas) from agriculture, forestry feedstocks or municipal solid and/or other waste (raw materials) to displace the use of fossil fuel. Promote the development of technologies and production systems that use MSW Biomass to produce liquid or gaseous biofuels and the use of biomass in conjunction with other resources to produce ethanol. Biodiesel and compressed natural gas use will offset fuel derived from petroleum and will lead to decreased fossil fuel-based CO₂ emissions. Provide market incentives to develop biofuels technologies from the multiple feedstocks.

Policy Design

Goals: *Maximize the production of liquid biofuels in Florida, such that by 2025 the state utilizes approximately 20% of available biomass supply per year to produce biofuels with significantly lower embedded GHG emissions compared to conventional fuel products (from a life-cycle perspective).*

Maximize the production of liquid, gaseous and biofuels in Florida, such that by 2025 the state utilizes approximately 20% of available biomass supply per year to produce biofuels with significantly lower embedded GHG emissions compared to conventional fuel products.

Produce enough in-state biodiesel fuel to offset 2% of Florida's petro-diesel consumption by 2012 and 20% by 2020 using GHG-superior feedstocks.

- **Timing:** see above.
- **Parties Involved:** Municipal and county governments, private solid waste management companies, local economic development agencies, Florida Department Environmental Protection, The Florida Energy Commission, non-government organizations, public interest groups, Public Service Commission.
- **Other:** *Consider the following feedstock sources:*

a. Long-Rotation Forests – Need to promote the use of precommercial thinnings and nonmerchantable wood from overstocked lands for liquid biofuels in Florida by providing subsidies, tax credits or payment schemes that enable landowners to conduct proper thinning and removals that benefit the health of the forest and decrease the chances of catastrophic wild fire. Promote the development of biomass utilizing facilities in appropriate locations that contain sufficient biomass but don't already contain commercial conversion facilities by providing infrastructure needed to support the development and transport of woody biomass. Promote development and deployment of advanced forest management practices, e.g., faster growing genetic stock with improved wood properties for conversion to electricity, steam and heat; that sustainably increases yields of biomass across the rotation.

b. Short-Rotation Forests – Need to promote the development and commercial deployment of select dedicated forest tree species in Florida by providing: Possibilities include 1) establish guarantees or provide subsidies for converting land near enough to facilities to short rotation forests, providing low cost loans to first time growers (overcome initial lack of cash flow), 2) landowner technical assistance programs, 3) promote stable and efficient markets for wood and residues from short rotation forests by creation of incentives for producing electricity, steam and heat from this source of biomass, 4) create opportunities for conversion facility owners to partner with existing land owners to establish long-term supply agreements, 5) development equipment and methods that can efficiently harvest and transport stems and residues to facilities that produce liquid biofuels

c. Other Energy Crops

d. MSW Biomass

e. Agriculture and Forestry Residues – Promote the use of forest residues by developing the technical means and improving the financial returns that make use of these residues commercially viable. Possibilities include: promoting research into harvesting, collection and compaction for transportation, subsidies that promote their use at conversion facilities.

Overall, policies need to decrease the risk and uncertainties associated with having sustainable supplies of good quality biomass at reasonable costs for the planned life time of the electrical, heat and/or steam producing facility. It is likely that a wide array of policies will be needed that influence both the land and conversion facility owners to dedicate themselves to using biomass feedstocks to produce renewable power.

Utilization of liquid and gaseous biofuel plants in close proximity to energy crops will cause reduction in the amount of energy required for transportation and fossil fuel use.

Combine technologies to enable us to produce ethanol by utilizing cellulosic biomass extracted from solid waste streams.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

TBD

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Sample Draft Policy Option Template

AFW-8 Promotion of Advanced Municipal Solid Waste Management Technologies (including Bioreactor Technology)

Policy Description

Promote the development and implementation of solid waste management technologies and practices that minimize or reduce GHG emissions.

Promote the deployment of bioreactor landfill technology that accelerate waste stabilization, enhances gas production and collection, controls leaching, reduces volume, and minimizes long-term liability of waste.

Policy Design

Goals: TBD

Decrease GHG emissions from solid waste management by 25% from business-as-usual by 2025.

Deploy bioreactor technology at 50% of new landfills by 2025.

- **Timing:**
- **Parties Involved:**

Other: A bioreactor landfill is essentially in-landfill composting activity at a Subtitle D sanitary landfill in which liquid, temperature, and air (for aerobic processes), are managed in a controlled manner to achieve rapid stabilization of the food, greenwaste, and paper-waste constituents. To optimize the rapid waste stabilization of these wastes, moisture, gas composition, gas flow, and temperature must be carefully maintained and monitored.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

DEP and the UF Hinkley Center for Solid and Hazardous Waste Management are currently funding three demonstration projects in Florida (see www.bioreactor.org).

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Sample Draft Policy Option Template

AFW-9 Improved Commercialization of Biomass to Energy Conversion & Bio-Products Technologies

Policy Description

Improved commercialization of biomass to energy conversion & bio-products technologies:

- a. Manure Digestion/Other Waste Energy Utilization*
- b. WWTP Biosolids Energy Production*
- c. Other Biomass Conversion Technologies*
- d. Bio-Products Technologies & Use*

The methane emissions inherent from the anaerobic decomposition process of manure and other wastes may be captured and used as an energy source. In so doing, it is possible to both reduce methane emissions and to offset fossil-based energy. However, the cost of emission capture and energy production can be higher than the value of the energy collected, making this option cost prohibitive for producers operating in a tight margin business. This option cover programs to increase the number of methane capture and energy recovery projects using manure or other waste. Methane digesters could be on-farm or a regional type digester could be employed.

Develop and implement methods for wastewater treatment plant (WWTP) biosolids processing and use as a renewable energy and nutrient source, including but not limited to co-firing with other fuels in existing or new combustion units for the purpose of generating electricity, heat or steam, and application of WWTP biosolids to agricultural soils.

Improve the rate of technology development and market deployment of biomass and MSW conversion technologies, including biomass gasification combined cycle (BGCC), pyrolysis, and plasma arc technologies.

Increase the amount of renewable products and chemicals produced and used, including building materials that reduce GHG emissions over conventional petroleum-based products. Promote the use of crop residues and MSW as a source of material for re-use (e.g. in building materials, packaging, or other materials).

Policy Design

Goals: TBD

Utilize 20% of available methane from livestock manure for energy production by 2025.

Utilize XX% of available WWTP solids for energy production or soil application by 2025.

Utilize XX% of available biomass and MSW as energy sources (overlaps with AFW-4 & AFW-7) by 2025.

Utilize 150,000 tons of bio-based products by 2025.

Develop plasma arc technologies for more efficiency by 2025.

- **Timing:**
- **Parties Involved:** Livestock Producers, Florida Farm Bureau, Sunbelt Milk Producers, Florida Cattlemen’s Association, Florida Electric Cooperatives Association, University of Florida-IFAS, Florida Department of Agriculture and Consumer Services, Florida Department of Environmental Protection, USDA-NRCS
- **Other:**

It should be noted that methane digesters are a proven technology, but Florida does present some specific challenges. Also any digester that would be constructed must ultimately be managed which could cause an additional burden on livestock producers without the proper assistance.

A range of renewable products can be developed from these biomass conversion processes processes, including gaseous and liquid fuels, biochar, chemical products, and methane to methanol. Existing processes include waste combustion and energy recovery (as electricity, steam, or both) or ethanol plants using co-products for heating and drying, rather than relying on outside energy sources.

Improve the utilization and development of bio-products for insulation and packaging material. Significant increase of bio-product technology is to be made available by 2017 for commercial, industrial and residential use.

Increased development of plasma arc technology will ultimately increase commercialization of such technologies.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

E.O. 07-127 RPS request may create additional demand for methane digesters; further recent rulemaking by the PSC would enable net-metering for up to 2 megawatts (MW) in capacity and standard interconnection for all distributed renewables, thus furthering the likelihood of this technology.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]

Sample Draft Policy Option Template
AFW-10 Programs to Support Local Farming/Buy Local

Policy Description

Promote the production and consumption of locally produced agricultural goods, including transportation and heating fuel and plastics, which displace the consumption of those transported from other states or countries.

Policy Design

Goals: TBD

Increase the purchasing of locally- produced agricultural goods by XX% by 2025.

- **Timing:**
- **Parties Involved:**
- **Other:**

The Florida Department of Agriculture and Consumer Services, Division of Marketing and Development has promoted the production and consumption of locally grown or produced goods through the Florida Agricultural Promotional Campaign, and through support to local Community Farmers’ Markets.

Over the last eight years the Florida retail campaign has focused considerable resources to promote our Fresh from Florida agricultural products in local markets including more than 1250 retail outlets in Florida: Publix, Winn Dixie, Albertson’s, Sweet Bay, Harvey’s and Sedano. Local stores are strategically placed by retailers to serve customers normally within a 5-10 mile radius. This existing system is the best means of moving sufficient quantities of fresh product into an existing, efficient distribution system.

We support the Community Farmers’ Markets by providing a kit on “How to Organize, Operate and Market Farmers’ Markets in Florida. Within this kit are resources including sample market rules, vendor applications and a sample farmer survey questionnaire. When requested, we provide marketing and management advice to these organizations. We help promote these farmers’ markets by maintaining a directory and website for them. We have also started a website listing of Community Supported Agriculture operations. The Farmers’ Market Nutrition programs provide monetary support to these markets in the sixteen counties it operates in.

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Florida Agricultural Promotional Campaign (FAPC) promotes local farming and agricultural products in Florida.

Types(s) of GHG Reductions

GHG reductions occur from reduced transportation-related emissions and reduced embedded energy.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until FLAT meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the FLAT]