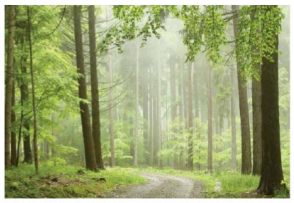
Pathways to Sustainability:

An Evaluation of Forestry Programs to Meet European Biomass Supply Chain Requirements



Brian Kittler, Project Director
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EDF Environmental Defense Fund — Finding the ways that work

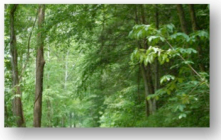
Pinchot Institute for Conservation

Presentation Outline

1) Land ownership in the Southeastern U.S.
2) Biomass supply chain complexity
3) Four pathways in operation in the U.S.
   - The coverage of the pathways on the landscape
   - How well the pathways mitigate environmental risks
   - How well the pathways match what Europe is looking for
4) Thoughts and conclusions

Lay of the Land – U.S. Southeast

- Largest wood pellet producing region in the world and growing.
- 86% of forests in South (200 million acres) are privately owned, of which, two-thirds are NIPFs.
- More than 60% of NIPF parcels are at least 100 acres.
- Only 3% of NIPFs in the South have written forest management plans.
- Only 13% have received forest management advice.

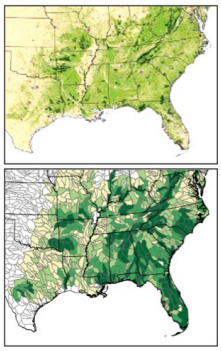


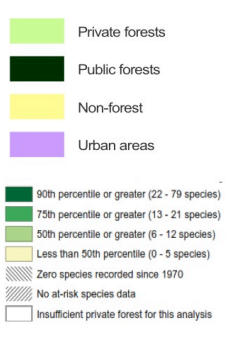
Complexity of Biomass Supply Chains

- Feedstock = largest cost of bioenergy projects
- 20 - 50% feedstock costs are in transport and handling (Altman and Johnson 2009).
- Brokers supplying facilities via long-term contracts provide storage and handling services, adding 10 - 20% to the cost (Altman and Johnson 2009).
- Supply chain complexity → increased risk → increased costs to document COC.

Challenges to Sustainable Supply Chains

<u>Traceability of supply and risk mitigation</u>





Four Pathways

1) Certified forest management
2) Controlled and mixed sourcing
3) Inspected compliance with stewardship plans and best practices
4) Uninspected compliance with stewardship plans and best practices

Pathways 1 & 2 – Certified Forest Management & Controlled and Mixed Sourcing

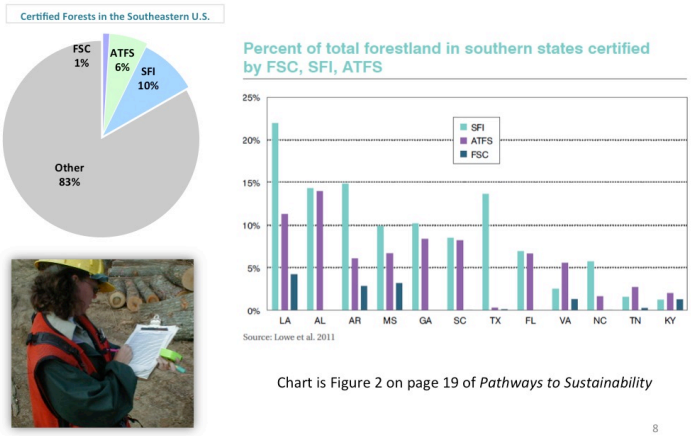
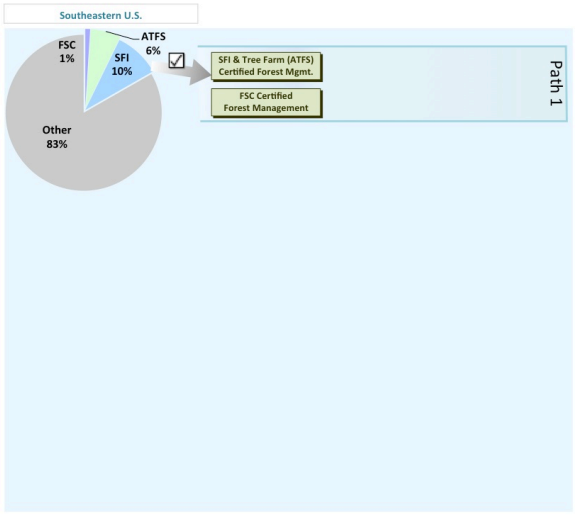
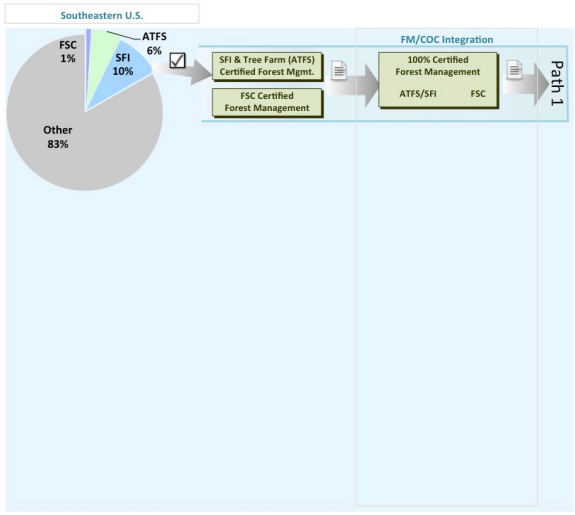
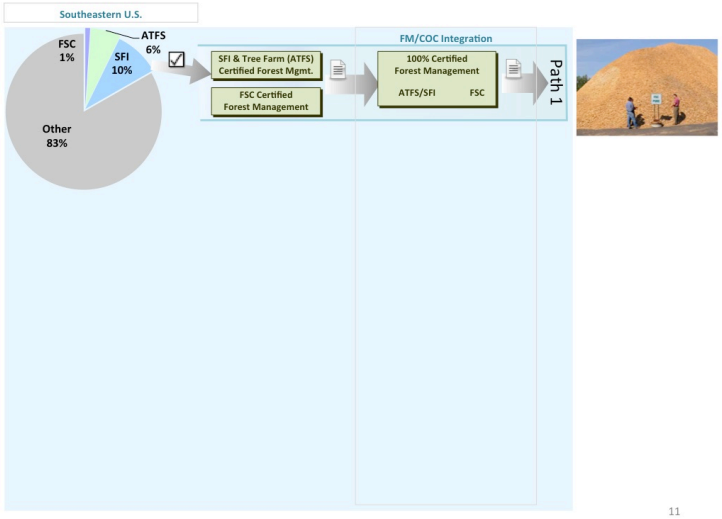
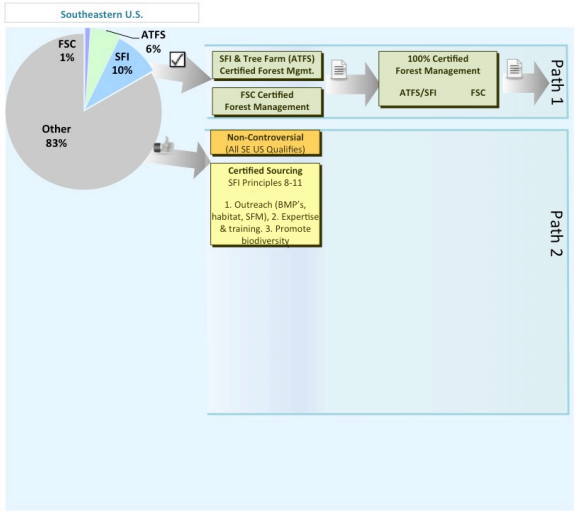


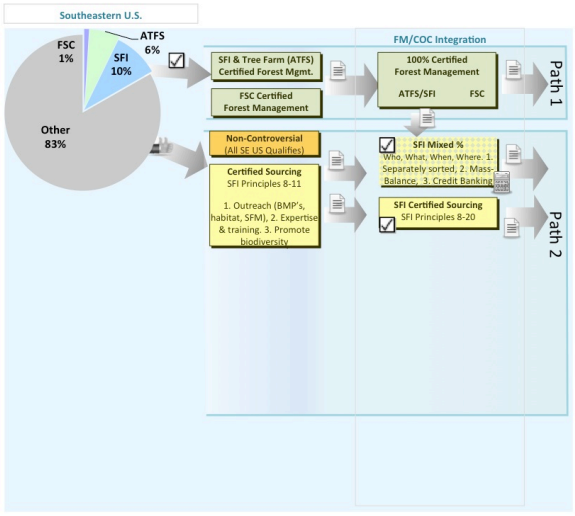
Chart is Figure 2 on page 19 of *Pathways to Sustainability*











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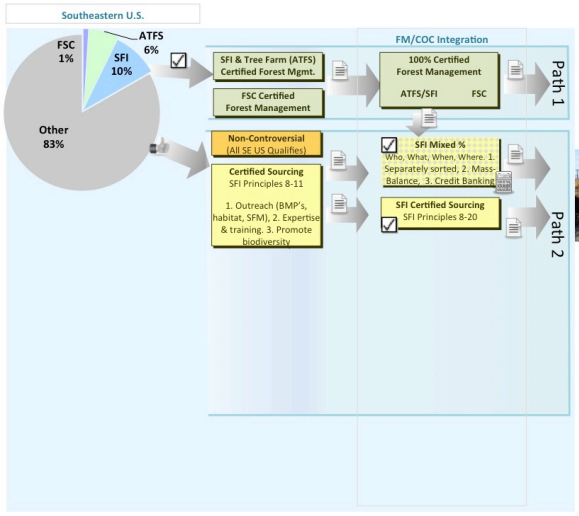

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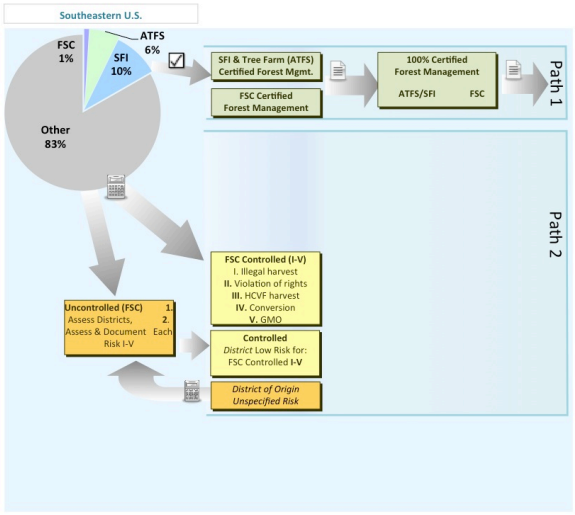

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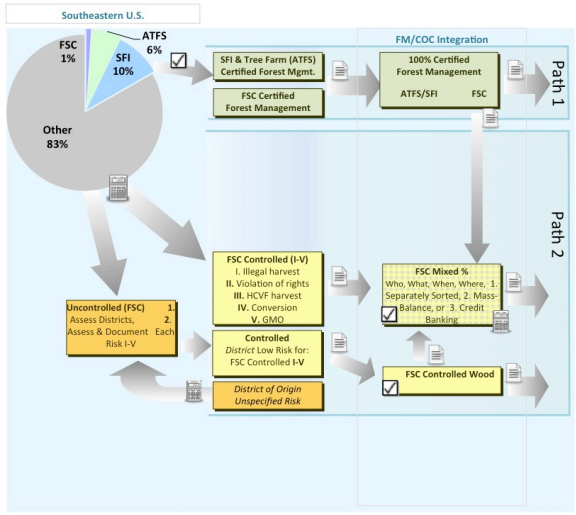

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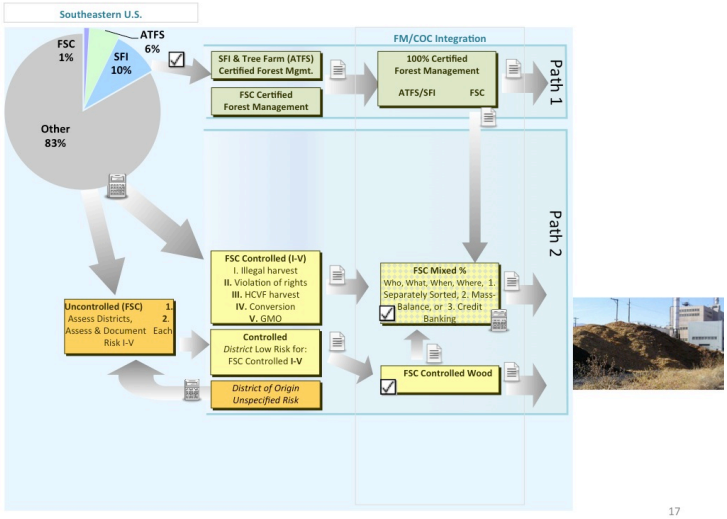

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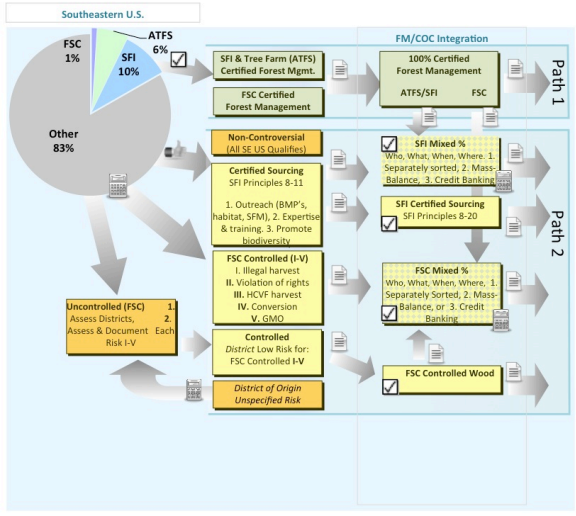

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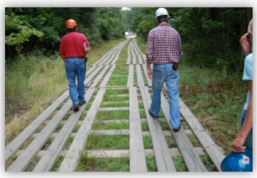
Pathways 3 & 4 – Inspected and uninspected compliance with stewardship plans and practices

- Best Management Practices (BMPs)
  - Predominant focus on water quality
  - 87% mean implementation rate in south
  - Mostly voluntary across south



- Biomass Harvesting Guidelines (BHGs)
  - Voluntary (Kentucky)
  - Build upon BMPs
  - Emphasize retention of DWM (15 – 35%)
  - Soils and stand-level biodiversity

Acreage of family forestland in southern states compared with acres enrolled in FSP and ATFS

Source: Butler 2008; Lowe et al. 2011; http://www.fs.fed.us/na/sap/products/

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Federal, state, and private incentives for NIPF landowners in the Southeast

State	Number of Federal agency-administered programs	Number of State agency-administered programs	Number of privately administered programs
Alabama (21 programs)	10 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	7 programs (AL Agricultural & Conservation Development Commission Program, property tax abatement, TREASURE Forest, SPBP, FSP, FLP, LIP)	4 programs (AL Tree Farm Program, Longleaf Alliance, State Woodland owners Association, Statewide Forest Trust
Arkansas (18 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	6 programs (SPBP, FSP, FLP, LIP, property tax abatement, AR wetland and riparian zone tax credit)	1 program (AR Tree Farm Program)
Florida (22 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	8 programs (SPBP, FSP, FLP, LIP, property tax abatement, Longleaf Pine Ecosystem Restoration Private Landowner Incentive Program, Florida Rural Development program, Rural and Family Lands Recovery program)	3 programs (FL Tree Farm Program, Longleaf Restoration Program, statewide forest trust)
Georgia (20 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	6 programs (Team Agriculture Georgia, property tax abatement, SPBP, FSP, FLP, LIP)	3 programs (Longleaf Alliance, statewide forest trust, GA Tree Farm Program)
Kentucky (20 programs)	10 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 2 U.S. FWS programs)	7 programs (KY habitat improvement program, property tax abatement, SPBP, FSP, FLP, LIP)	3 programs (state Forest Trust, KY Woodland Owners Association, KY Tree Farm Program)
Louisiana (19 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	6 programs (property tax abatement, LA Forestry productivity program, SPBP, FSP, FLP, LIP)	2 programs (LA Tree Farm Program, Longleaf Alliance)
Mississippi (21 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	7 programs (property tax abatement, reforestation tax credit, MS forest resource development program, SPBP, FSP, FLP, LIP)	3 programs (statewide forest trust, MS Tree Farm Program, Longleaf Alliance)
North Carolina (22 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	7 programs (NC Forest Agriculture Cost-Sharing Programs, NC Forest Development program, tax abatement program, SPBP, FSP, FLP, LIP)	4 programs (statewide forest trust, NC woodland owners association, NC Tree Farm Program, Longleaf Alliance)
South Carolina (20 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	6 programs (SC Forest Renewal Program, property tax abatement, LIP, FSP, FLP, SPBP)	3 programs (statewide forest trust, SC Tree Farm Program, Longleaf Alliance)
Tennessee (19 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	7 programs (TN Agricultural Enhancement Program, property tax abatement, Farm Wildlife Habitat Program, SPBP, LIP, FSP, FLP)	1 program (TN Tree Farm Program)
Texas (19 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	6 programs (Statewide Forest Trust, SPBP, LIP, FLP, FSP)	2 programs (TX Tree Farm Program, Longleaf Alliance)
Virginia (23 programs)	11 programs (BCAP, CRP, CSP, EWP, EQIP, HFRP, WRP, WHIP, 3 U.S. FWS programs)	11 programs (VA riparian buffer tax credit, Reforestation of Timberlands program, BMP cost share program, VA Pine Bark beetle Prevention Program, VA BMP tax credit nutrient and pesticide application equipment, tax abatement program, Firewise Virginia, SPBP, LIP, FSP, FLP)	1 program (VA Tree Farm Program)

Source: Greene et al. 2010)

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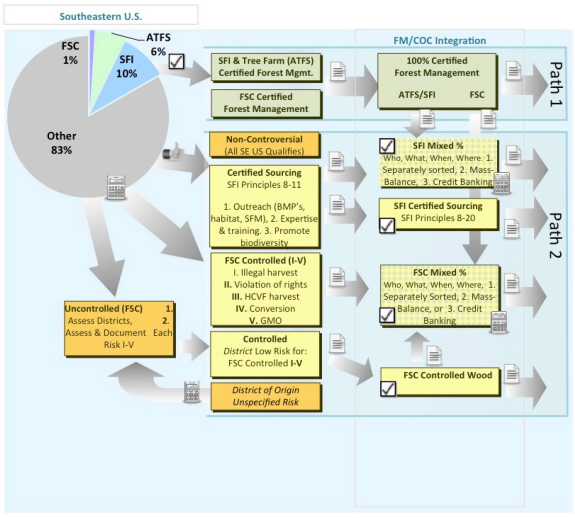

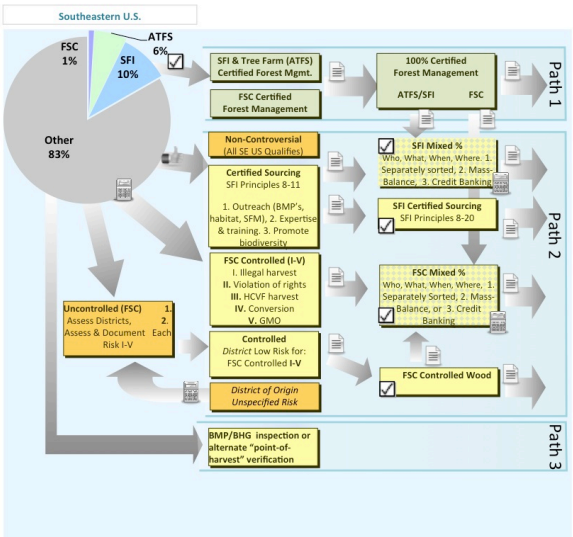

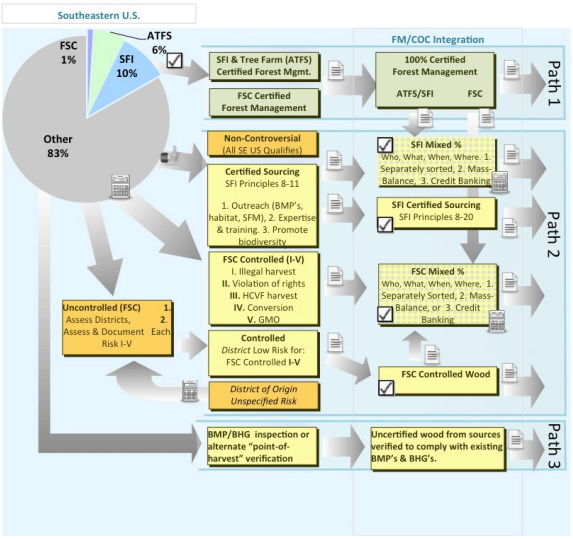

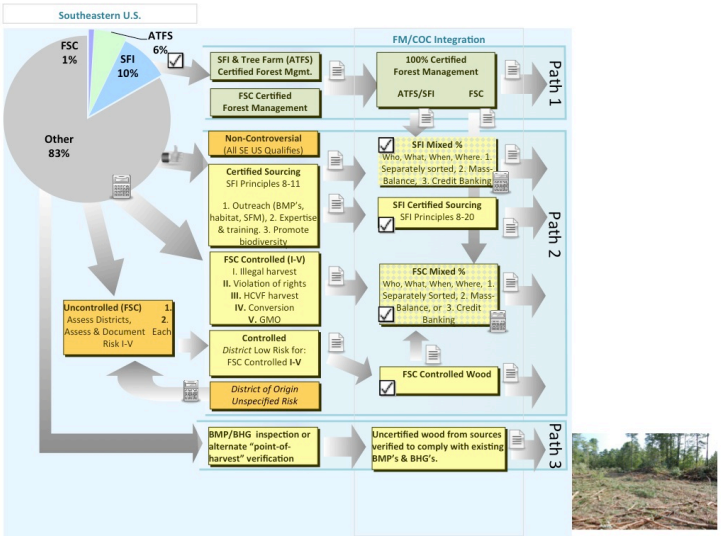

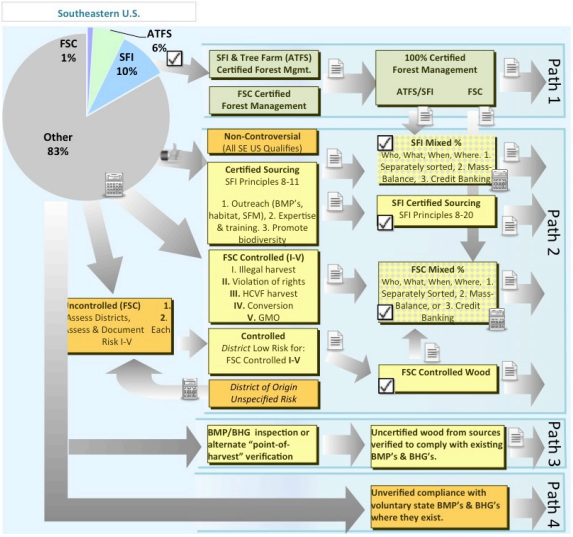

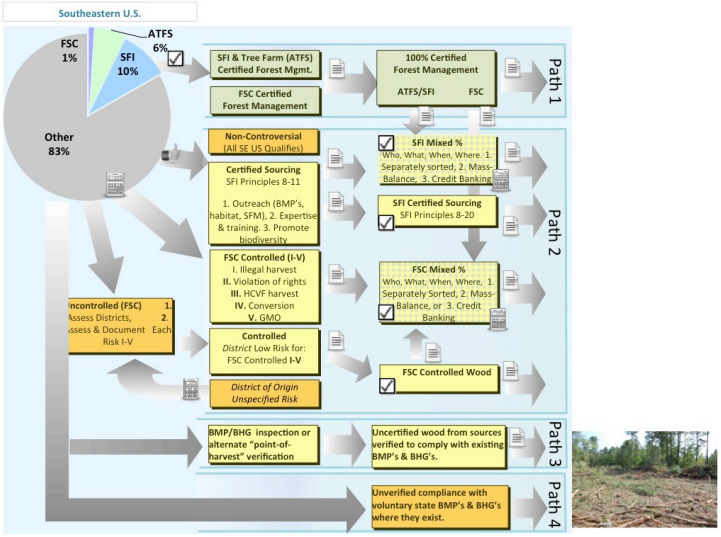

How do these Pathways Interact with European Policy Drivers?

- EU RED criteria for solid biomass (GHG LCA, mass balance COC, protect biodiversity, no conversion, no carbon dense forests, wetlands, or peatlands).
- ISO TC 248 - "*Standardization in the field of sustainability criteria for production, supply chain and application of bioenergy. This includes terminology and aspects related to the sustainability (e.g., environmental, social and economic) of bioenergy.*"
- EU Timber regulation – A call for increased due diligence on tracing wood supply generally.

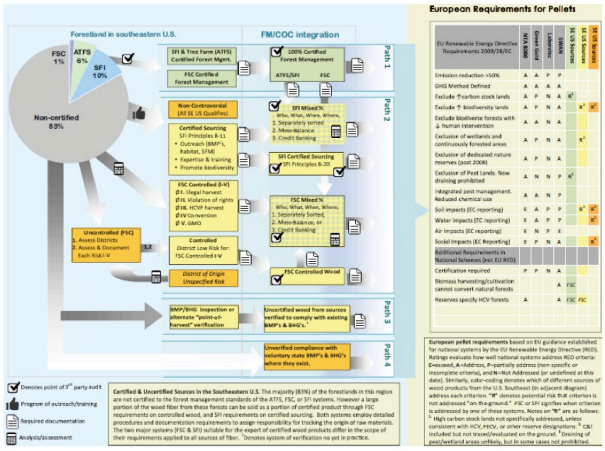

Figure 6 is available on page 29 of *Pathways to Sustainability.*

European pellet standards based on EU guidance established for national systems by the EU Renewable Energy Directive (RED). Ratings evaluate how well national systems address RED criteria:

E=exceed

A=Address

P=partially address (non-specific or incomplete criteria)

N=Not Addressed (or undefined at this date). Similarly, color-coding denotes which of different sources of wood products from the U.S. Southeast (in adjacent diagram) address each criterion.

"R" denotes potential risk that criterion is not addressed "on-the-ground." *FSC* or *SFI* signifies when criterion is addressed by one of these systems. Notes on **"R"** are as follows:

R1 High carbon stock lands not specifically addressed, unless consistent with HCV, FECV, or other reserve designations.

R2 C&I included but not traced/evaluated on the ground.

R3 Draining of peat/wetland areas unlikely, but in some cases not prohibited.

EU Renewable Energy Directive Requirements 2009/28/EC	NTA 8080	Green Gold	Laborelec	SWAN	SE US Sources	SE US Sources	SE US Sources
Emission reduction >50%	A	A	P	P			
GHG Method Defined	A	A	A	A			
Exclude ↑carbon stock lands	A	P	N	A	R[1]		
Exclude ↑ biodiversity lands	A	P	N	A		R[2]	R[2]
Exclude biodiverse forests with ↓ human intervention	A	A	N	A			
Exclusion of wetlands and continuously forested areas	A	P	N	A		R[2]	
Exclusion of dedicated nature reserves (post 2008)	A	P	N	A			
Exclusion of Peat Lands. New draining prohibited	A	N	N	P	R[3]		
Integrated pest management. Reduced chemical use	A	A	N	P			
Soil impacts (EC reporting)	E	A	P	P		R[2]	R[2]
Water impacts (EC reporting)	E	A	P	P			R[2]
Air Impacts (EC reporting)	E	N	P	E			
Social Impacts (EC Reporting)	E	P	N	A			R[2]
Additional Requirements in National Schemes (not EU RED)							
Certification required	P	P	N	A			
Biomass harvesting/cultivation cannot convert natural forests				A	*FSC*		
Reserves specify HCV forests	A			A	*FSC*	*FSC*	

EU renewable energy directive sustainability criteria

	PROCUREMENT PATHWAYS			
	Certified forest management	Controlled and mixed sourcing	Inspected compliance for stewardship plans and practices	Uninspected forest operations
Social impacts				
Exclude biodiverse forests with decreased human intervention				
Water impacts				
Soil impacts				
Exclude high biodiversity lands				
Exclude wetlands and continuously forested areas				
Integrated pest management; reduced chemical use				
Exclude peat lands; new drainage prohibited				
Exclude high carbon stock lands				
Emission reduction >50%				
GHG methodology defined				
Air impacts				

Procurement pathway *fully* addresses sustainability requirement
Procurement pathway *partially* addresses sustainability requirement
Procurement pathway does not address sustainability requirement

Table is available on page 34 of *Pathways to Sustainability*

Comparison of criteria for sustainable forest management with various voluntary schemes

Criteria		EC-RED Requirement Directive 2009/28/EC (liquid fuels)	Report COM (2010)11 (Guidance for member states on solid biomass criteria)	DNAX (UK)	NTA 8080 (Netherlands)	Green Gold Label (Essent, Netherlands)	Laboreleo System (Belgium)
1	**Conservation of Biological Diversity**						
1.1	Species Diversity	1	1	2	1	1	—
1.1.1	Important Species (i.e., state natural heritage) Identified in a Forest Management Plan	1	1	2	1	*	—
1.2	Provisions for Genetic Diversity	—	—	—	—	—	—
1.3	Important Wildlife Habitat Across Landscape	1	1	2	1	1	—
1.4	Important Wildlife Habitat at the Stand Level	—	—	—	—	—	—
1.5	Amount and Distribution of Organic Matter Present on Forest Floor	—	—	—	*	—	—
1.6	Ecological Reserves/Special Area/Protected Areas	3	—	2	*	*	—
1.7	Rare forest types (e.g., Old Growth)	4	1	2	1	*	—
1.8	Riparian & Aquatic System Biological Resources	1	1	2	1	1	—
2	**Maintenance of Productive Capacity of Forest Ecosystems**						
2.1	Ecological Function/Maintenance of Forest Nutrient Capital over the Long-term	—	—	—	—	—	—
2.2	Landscape-Scale Spatial Patterns (e.g., Fragmentation and Connectivity)	—	—	—	—	—	—
2.3	Representation of Regionally Appropriate Forests and Structural Diversity	—	—	—	—	—	—
2.4	Retention of Deadwood (Coarse Woody Debris, Fine Woody Debris, Snags)	—	—	—	*	—	—
3	**Maintenance of Forest Ecosystem Health and Vitality**						
3.1	Forest Protection/Health: Fire	—	—	—	—	—	—
3.2	Forest Protection/Health: Exotic Species/ Noxious Weeds	—	—	—	—	—	—
3.3	Forest Protection/Health: Pests and Pathogens	—	—	—	—	—	—
3.4	Forest Protection/Health: Hazardous Materials/Debris/ Waste	—	—	—	—	—	—
3.5	Harvest Operations and Access: Forest Roads	—	—	—	—	*	—
3.5	Vehicles and Machinery Used in Harvest Should Cause Minimal Damage to Ecosystem	—	—	—	—	*	—
4	**Conservation and maintenance of Soil and Water Resources**						
4.1	Resource Conservation: Water Yield and Water Quality	*	—	*	—	*	*

Table is available on page 38 of *Pathways to Sustainability.*

Are these Pathways Feasible?

Sourcing claims:

(1) 100% sourced with SFI Fiber Sourcing, FSC Controlled Wood, and Green Gold Label COC

(2) 54% sourced from PEFC (SFI and ATFS) certified forests

Are these Pathways Feasible?

What could be done about the 46% not being sourced from certified forests?

• Master logger BHG training/point of harvest option

• Price premiums for performance (example = Gainesville Regional Utility)

• Hire foresters to oversee harvests (example = McNeil Generating Station)

Conclusions

- To the extent that the EU RED and country-level requirements demand low risk biomass, certification of supplies is the most sound strategy currently available.
- Procedures to certify heterogeneous mixes vary and are generally less reliable for demonstrating conformance with European standards, but these options are still useful to control risks and promote better forest management.
- An alternative to certification-based programs is to rely on regulatory and non-regulatory measures and seek to elevate compliance with European measures (e.g. point of harvest approaches and preferred purchasing).
- The costs of risk mitigation are somewhat unknown in wood energy markets. There needs to be more work in this arena. (pilot projects, multi-stakeholder dialogue, early leaders)

Thank You!

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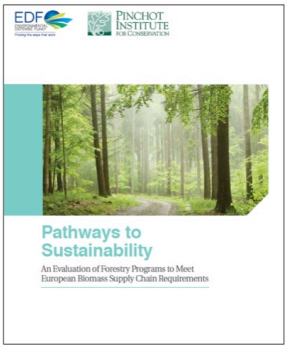

The Pathways report is available here:

www.pinchot.org/pathways

www.edf.org/bioenergy