

***Technical Workshop for  
Biomass Project Implementation:***

***Under the Proceeding on the Motion of the Commission  
Regarding a Retail Renewable Portfolio Standard (RPS)***

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## Workshop Agenda

- RPS role for Biomass
- Deciding Key Implementation Elements (Provisions, Questions, Solutions)
  - Limited use of Adulterated Biomass
  - Repowering and Cofiring Accounting
  - Harvested biomass
- Other Considerations
  - Certification and verification organizations
  - Future issues to watch for 2009 Review

## Part 1 RPS Role for Biomass

Baseload Power Generation from  
Sustainable Harvests and  
Byproducts

## Biomass Potential in New York

- Key Biomass Resources in NY
- Biomass Benefits

## Key Decisions on Eligible Resources

- What's In
  - Unadulterated biomass in all forms
  - Manures
  - Very limited eligibility for adulterated biomass
- Restrictions
  - Forest management and harvest rules
  - CAFO compliance requirements
  - Adulterated biomass restricted on sources, conversion technology and emissions performance

## NYSERDA Guide - Biomass Developers

1. Introduction to the RPS
  - i. Overview of Eligible Biomass Resources
  - ii. Biomass Project Technology Matrix
  - iii. Basic Eligibility Requirements
2. Feedstocks
  - i. Certification for Harvested Biomass
  - ii. Requirements for Limited Use of Adulterated Biomass
3. Conversion Technologies
  - i. Cofiring Measurement Methods and Accounting
  - ii. Testing and Certification for Adulterated Biomass

## Part 2 Qualifying Adulterated Feedstocks

### Emissions Test and Evaluation Protocols

### Order Provision: *Adulterated Biomass Emissions Standard*

#### Key Questions:

- Emissions covered – Criteria pollutants and other emissions of concern
- Procedure for establishing baseline emissions on unadulterated biomass resources
- Procedures for measurement of emissions for specific adulterated biomass fuels
- Interpreting test results – would offsets be considered

## Possible Implementation Solutions

- Initial concept-DAR3 “Like” Approach  
([www.dec.state.ny.us/website/dar/ood/policydocs.html](http://www.dec.state.ny.us/website/dar/ood/policydocs.html))
- Chemical analysis to determine potential pollutants of concern relative to unadulterated fuel
- Emission testing required to verify (statistically) less than or equal to for adulterated conversion
- System level approach would consider air/water/solid waste issues
- Precedents acceptable for bypassing emissions testing

## Order Provision: Adulterated Biomass - *Processing/Separation*

### Key Questions

- Eligible sources of adulterated biomass
- Types of facilities eligible
- Level and responsibility for monitoring and verification

## Possible Implementation Solutions

- Eligible sources of mixed adulterated biomass limited to NYSDEC permitted solid waste facilities
- Monitoring
  - State agency or third party monitor conducts random inspections of facility
  - Facility must submit operational plan
  - Monitoring paid for by facility

## Part 3 Incremental Capacity/Cofiring

Measuring the RPS Eligible Portion  
of Generation

## Order Provision: Measurement Protocol *Incremental capacity at existing facilities*

- Key questions
  - Baseline Period?
  - Calculation for Incremental?
- Initial concepts
  - Baseline Period
    - 5 years prior to January of 2003
  - Baseline Energy Calculation
    - Average Heat input (MMBtu/yr)
    - Average Heat Rate (Btu/kWh)
    - Average Renewable power generation (kWh)
  - Incremental Renewable Power
    - Baseline resources (RPS Eligible?)
    - Yearly generation from RPS eligible resources and technology less baseline

## Order Provision: Measurement Protocol *Cofiring Accounting/Verification*

- Key questions (General)
  - Accounting for renewable portion of generation at mixed fuel plant?
  - Verification strategies?
  - Data requirements?
- Initial concept (all fuel, plant types)

*The amount of renewable generation from the plant (or generation unit) is proportional to the amount of input energy provided by the renewable fuel to that unit.*

## Key Principles for Cofiring Measurement

- Measurement/Verification Principals
  - Accounting/Verification rules must respect differences in cofiring operations
  - Rules and accounting procedures must be understandable and not be too onerous for plant or verifying agency staff
- Ideal
  - Ideal Strategy would require only one accounting/verification method for all types

## Cofiring Guidance – Solid Fuels

- Underlying Requirements for Plant
  - Must have accurate mass flow measurements for biomass fuels
  - Must keep sufficient data/records to convert mass flow data into boiler heat input
  - Must use approved method for calculating total heat input or electric conversion rates

## Cofiring Guidance – Solid Fuels

- Biomass heating value data
  - Full ultimate analysis once a year
    - For each type of fuel from each supplier
    - First analysis required prior to qualified firing
  - Moisture analysis
    - Regular grab samples from each truck or random sampling to test for statistical significance
    - Analysis used to adjust baseline HHV for moisture
- Data recording
  - Fuel receipt and moisture analysis log entry for fuel each delivery (type, source, amount, MCW)

## Cofiring Guidance – Solid Fuels

- Calculation of Renewable Power Generation
  - Option 1 – F Factor based calculation
    - Input Data
      - (1) Biomass flow data (tons/hr)
      - (2) F-Factors for coal and wood
      - (3) Stack gas CO<sub>2</sub> concentrations
      - (4) Biomass heating values
    - Calculations
      - Items 1,2,3 to calculate total boiler heat input
      - Items 1,4 to calculate biomass heat input
      - %Cofiring = Biomass Heat / Total Heat Input
      - **%Cofiring (Total Generation) = Renewable Energy**

## Cofiring Guidance – Solid Fuels

- Option 2 – Biomass Energy Curve
  - Initial Test Protocol – Biomass Energy Curve
    - Constant coal flow baseline and plant output
    - Plant output at various biomass feed rates
    - Repeated for various biomass moisture contents
  - Output – Correlation Curve
    - Biomass heat input versus Renewable electricity output
  - Input Data
    - (1) Correlation Curve
    - (2) Biomass flow rates
    - (3) Biomass heating values
    - (4) Cofiring time frame
  - Calculations
    - Items 2,3,4 to calculate average biomass heat input
    - Item 1 to calculate renewable energy generation

## Cofiring Guidance – Solid Fuels

- Special Circumstances
  - Cofiring eligible and ineligible fuels
    - Possible at new dedicated biomass plants
    - Possible in fossil/biomass cofiring firing facilities
  - Possible Approach
    - Eligible and ineligible fuels are not commingled
    - RPS eligible generation measured while continuously firing eligible resources

## Cofiring Guidance – Gaseous Fuels

- Underlying principals remain the same
  - Physical measurements plus reasonable calculations to portion renewable generation
- Key data required
  - Physical measurement of volumetric flow rates for natural gas and biogas
  - Pipeline gas quality report for natural gas
  - Ultimate analysis data for biogas

## Cofiring Guidance – Gaseous Fuels

- Two Types to Consider
  - Cofired in an engine or turbine
  - Cofired in a boiler
- Two Resources to Consider
  - Landfill gas
  - Gas generated from solid biomass fuel gasification

## Cofiring Guidance – Gaseous Fuels

- Biogas flow measurement
  - Mass flow meters
  - Volumetric flow meters
- Biogas heating value data
  - Gasifier Systems
    - Average heating value from commissioning tests
    - Once a year calibration (tested fuels)
    - New test data for new fuel types introduced
  - Landfill Gas Systems
    - Ultimate analysis data
    - Once a year ultimate analysis data
- Data recording
  - Monthly totals from flow meter totalizers

## Cofiring Guidance – Gaseous Fuels

- Calculation of Renewable Power Generation
  - Boilers (similar to solid fuel cases)
    - F Factor based calculation
    - Biomass Energy Curve
  - Engines
    - Pro rata of generation based on relative heat contribution of landfill gas and natural gas
      - Based on LHV for natural gas and landfill gas
      - Based on metered flow rates
  - Special Circumstances
    - Natural Gas/Biogas mixed up stream of conversion facility
      - Cofiring percentage based on mixture at point of LG injection
      - Data requirements same as above

## Cofiring Guidance – Gaseous Fuels

- Special Circumstances
  - Natural Gas/Biogas mixed up stream of conversion facility
    - Option 1 – Ensures LFG to Electricity Conversion
      - Cofiring percentage based on mixture at point of LG injection
      - Data requirements remain unchanged, but imposed at remote location
      - Most accurate means of establishing LFG to kWh
    - Option 2 – Encourages LFG Development
      - Contract for LFG volumes (presumably upgraded for pipeline transport)
      - Generation records
      - Accounts for costs and environmental benefits at source of benefit generation—the landfill
      - Only a portion of the LFG is converted to kWh
      - May cause conflicts w/ TRC standards in other areas

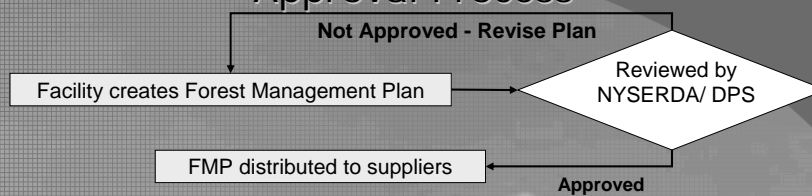
## Part 4 Harvested and Silvicultural Waste Wood

Forest Management and Harvest Plan  
Templates to Assist Biomass Developers  
Conform to Eligibility Requirements

## Forest Management Plan

- Developed for each biomass facility
- Prepared by professional forester
- Reviewed and approved by  
DPS/NYSERDA

## Harvested and Silvicultural Waste Wood Approval Process



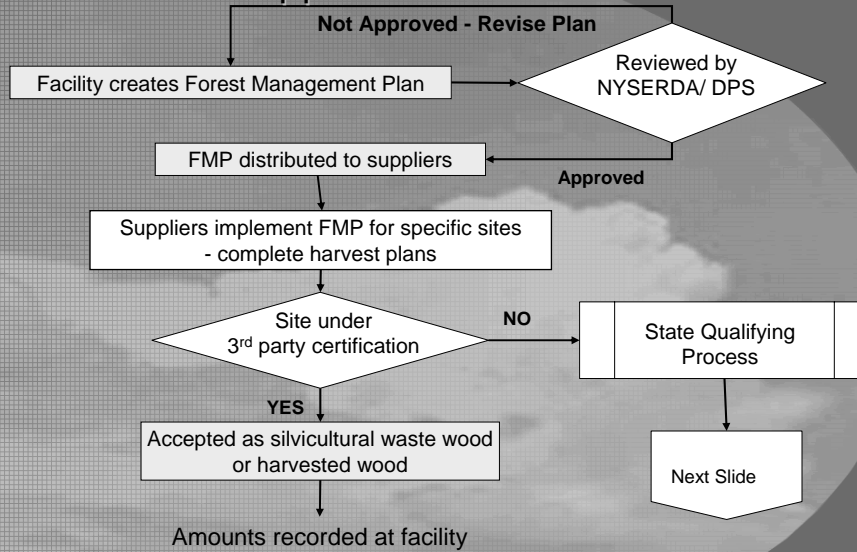
## Forest Management Plan

- Includes standards and guidelines for sustainable forest management
- Adheres to management practices to:
  - Conserve biological diversity
  - Conserve productive forest capacity
  - Promote forest ecosystem health
- Lists forest management guidelines to follow
  - NYS BMPs
  - Recognized silvicultural guidelines

## Forest Management Plan

- Template for harvest plans (model supplied in the Guide)
- Required content of harvest plans
- Commitment to have professional forester monitor and report on harvesting operations
- Agree to regular inspections of harvesting sites

## Harvested and Silvicultural Waste Wood Approval Process



## Harvest Plans

- Template to be provided in "Guide for Biomass Project Developers for Participation in the NY RPS Program"
- Completed by each supplier for each harvesting operation

## Harvest Plans

- Includes site information
  - Site location and landowner information
  - Organization performing harvest
  - Date of plan
- If site is under non-government certification, then certification information is recorded

## Harvest Plans

- Sites not certified by non-government process need to include the following information (pg 54 April 14, 2005 Order)
- Management goals
  - Landowner objectives
  - Site characteristics
  - Impact on ecology

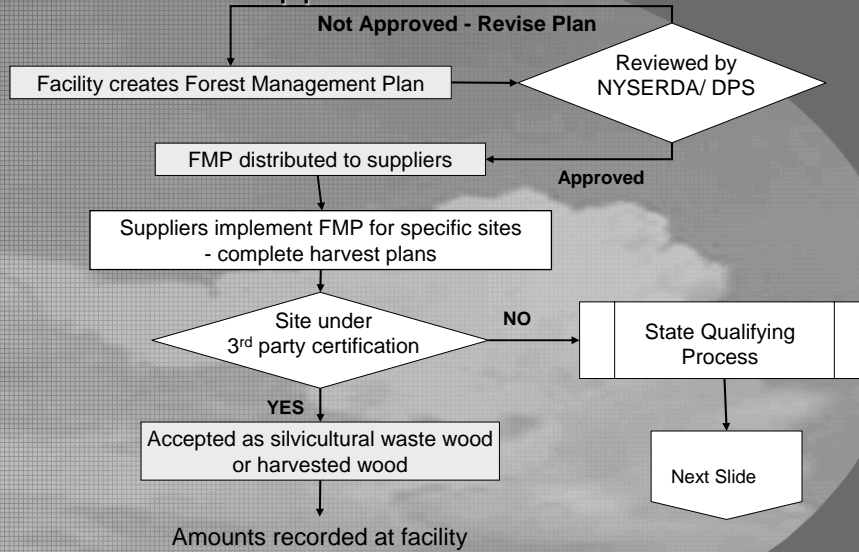
## Harvest Plans

- Site details
  - Map including area to be harvested, skid road layout, stream, wetland, water body locations, forest type designation
  - Harvest objective
  - Type of harvest
  - Silvicultural techniques to be employed
  - Anticipated volume of harvest
  - Best management practices to be implemented

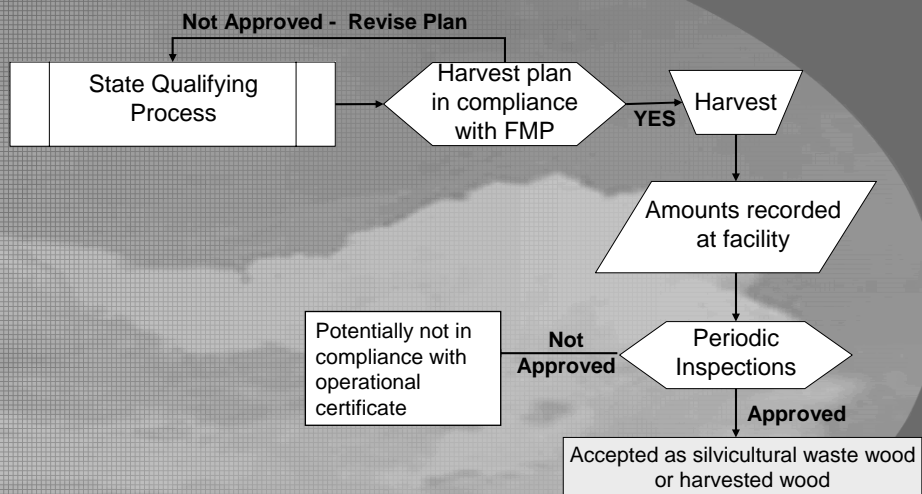
## Non-Governmental Certification Systems

- Required to use third party certification mechanism and periodic re-inspections
- Three systems accepted in April 14, 2005 order (pg 55-56)
  - Forest Stewardship Council (FSC)
  - Sustainable Forestry Initiative
  - Tree Farm

## Harvested and Silvicultural Waste Wood Approval Process



## State Approval Process



## Part 5 Other Considerations

Aspects of Biomass Resource  
Development to be Reviewed in  
2009

### Implementation

- Which organizations perform certification?
- Which organization sets the thresholds for RPS required emissions testing?
- What aspects of biomass power generation should be monitored in the initial RPS period?