



Waste Management Sector

June 18, 2013

California Environmental Protection Agency
 **Air Resources Board**

Cal Recycle 

Workshop Agenda

- Overview of Waste Sector
- Presentations on Background Papers
- Open Discussion
- Next Steps

Comments/Questions

climatechange@calrecycle.ca.gov



Scope of Waste Sector Plan

- Recycling, Reuse, Remanufacturing
- State Procurement
- Composting and Anaerobic Digestion
- Biomass Conversion
- MSW Thermal Technologies
- Landfilling of Waste
- Implementation Plan



Addresses Multiple Mandates

- AB 32 2008 Scoping Plan
 - early action measures – landfills, recycling & organics
 - other longer-term measures
- AB 341's statewide 75% recycling requirement
 - Report to Legislature 1/1/14
- ARB Resolutions (2011, 2012) – further work on sector
- AB 32 2013 Scoping Plan Update



Interconnections

- Issues related to waste sector are diverse and interconnected
- Water, energy, transportation, agriculture, natural resources sectors
 - Particularly for organics (e.g., food/green)
 - 1/3 of landfilled materials = compostable organics → significant CH₄ emissions
- Historical collaboration with agencies & depts



State Agency Interconnections

- California Energy Commission
- California Public Utilities Commission
- California Department of Food and Agriculture
- State Water Resources Control Board
- Cal Fire
- Department of General Services
- Department of Toxics Substances Control



Overall Vision of Plan

- Take ownership of waste generated in California
- Maximize recycling and diversion from landfills
- Build infrastructure for low-carbon system in California
- Improve sustainability of California infrastructure
- Reduce volume of waste generated



2020 Goals

- AB 341 75% = primary foundation for reducing emissions by 2020
- To achieve 75%, need to move 22 million tons from landfills
- ➔ 20 – 30 MMTCO₂e reduction
 - Why? Displacement of fossil fuels used in extracting/ processing virgin materials, avoided landfill CH₄
- Key consideration – don't need to wait for technology development
- Key barrier – technology deployment



Achievements For 2020

- Progress towards 2020 began with 2008 Scoping Plan
- Early action landfill regulations
- Mandatory commercial recycling regulations
- Emission reduction factors
- LCFS pathway for high-solids anaerobic digestion
- EPR – carpet and paint
- Mid-course measurement slated 2015/16



Goals For 2035 and 2050

- 2035: Net-Zero (direct GHG – avoided GHG = 0)
 - Pre-2020 efforts can achieve significant GHG reductions
 - Will strongly influence post-2020 actions
- 2050: Reduce direct emissions by 25%



Challenges

- How to get consumers and producers to take responsibility for waste and products
- How to overcome barriers to building infrastructure in CA
 - Economic – cheap landfilling; lack of financial incentives, offsets
 - Siting and timely permitting – local planning and land use issues, cross-media regulatory issues re: air and water
- How to grow markets for products – whether recycled-content or biofuel, etc.
- Whether aspects of sector require direct regulation or inclusion in Cap-and-Trade
- Tracking and accounting



Plan Focus

- Reducing waste generated – get individuals and manufacturers/ producers to take more responsibility for products and for waste
- Increasing recycling and use of collected materials in manufacturing, composting, digestion
 - To meet 75% goal, need much larger recycling manufacturing and composting/anaerobic digestion infrastructure
- Expanding and creating markets for recycled materials and products
- Determining role of thermal processes and energy recovery



Potential Implementation Mechanisms and Actions

- Financial incentives for recycling manufacturing & composting/AD infrastructure
 - Leverage Cap-and-Trade funding
 - Criteria for disadvantaged communities
- Direct regulation by ARB
 - e.g., restrict landfilling of organics
- Bring sector sources under Cap-and-Trade
 - e.g., landfills and/or mass burn thermal facilities



Potential Actions (continued)

- Develop new emission reduction factors
- Investigate additional LCFS pathways
- Establish biogas injection standards
- Increase AB 118 \$\$ for biomethane projects
- Leverage State procurement



Potential Actions (continued)

- Develop performance standards for MRFs
- Develop programmatic EIRs
- Consider expanded RPS eligibility
- State procurement requirements
- EPR for packaging



Next Steps

- Stakeholder input on technical papers and draft implementation matrix
- Comments by July 12
- Comments will inform:
 - Scoping Plan Update
 - 75% Report to Legislature



Recycling, Reuse, and Remanufacturing



Processing Infrastructure

- 73 MT waste generated in 2010
- 36 MT recycled, 37 MT disposed

Type of Facility	Number of Facilities	Current Throughput M tons/year	Remaining Capacity M tons/year
Material Recovery Facilities	137	11.9	16.9
C&D Processing Facilities	242	29.9	30.2
Secondary Recyclables Processing Facilities	223	6.6	3.1
Totals	602	48.4	50.2

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18

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Utilization of Recycled Materials

Type of Facility	Number of Facilities	Current Throughput M tons/year	Remaining Capacity M tons/year
Glass Remanufacturing	13	0.7	0.1
Paper Remanufacturing	14	1.1	0.005
Plastic Remanufacturing	21	0.4	0.07
Tire Remanufacturing	74	0.05	0.04
Totals	122	2.3	0.2

Number and Throughput of CA Facilities in the Remanufacturing Infrastructure



Goals for Increasing Remanufacturing and Achieving GHG Benefits

- 22 MT removed from landfill annually to meet AB 341 75% goal
- Would result in 20-30 MMTCO₂e reduction in 2020
- Propose 2035 goal of net-zero GHG emissions for waste sector
- Propose 2050 goal of 25% reduction below 2035 goal for waste sector



Challenges

- Insufficient emission reduction factors
- Permitting for new and upgrading existing facilities
- Low cost of landfilling and lack of incentives for alternatives
- Market demand for recycled and remanufactured materials
- Quality of collected materials



Potential Solutions

- GHG emissions reduction quantification
- Permitting and siting of facilities
- Develop new financial Incentives
- Increase markets for recycled products
- Direct regulation
- Improve quality of recyclable materials
- Identify future research
- Reduce volume of waste generated



State Procurement



State Procurement

- **State purchases are significant**
- **Choice of goods can impact GHG and environment**
- **Post Consumer Recycled-Content (PCRC) products offer GHG reductions and create more jobs than alternatives**
 - Benefits from reduced raw material extraction - key factor
 - Transportation relatively less significant
- **Great opportunity for further benefits**
- **Important to consider multiple environmental impacts**



Overview

State Contract & Procurement Registration System (SCPRS)

- Tracks all purchases of goods and services over \$5,000.
- Total reported **\$14 billion** (Goods \$1.5 Billion + Services \$12.5 Billion)

State Agency Buy Recycled Campaign (SABRC)

- Tracks purchases of recycled-content products in 11 broad categories.
- Total reported: **\$185 million**

Each data source has different emphases and limitations



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Potential Focus Areas

- **SABRC Statutory Provisions**
- **Role of State Contractors**
- **Delegated Authority**
- **Reporting of Purchases**
- **Product Information and Certification**
- **Cost of Recycled Content Products**



Next steps

- **Continue to work with DGS**
- **Draft procurement paper will be released shortly**



Composting and Anaerobic Digestion



Status of Composting and AD Facilities in California

- Collection/Capacity
- Organics Processing Facilities
 - Compost, AD, Chip & Grind, Biomass



GHG Benefits of Composting and Anaerobic Digestion

- Avoided Landfill Emissions
- Displacement of Fossil Fuel with Biogas
- Reduction in Fertilizer and Water Use
- 50% of Compostable/digestible Organics Diverted = 3.0 TO 3.7 MMTCO₂e.
- 75% of Compostable/digestible Organics Diverted = 4.5 to 5.6 MMTCO₂e



Challenges to Meeting Short-Term Goals

- GHG Emissions Reduction Quantification
- Permitting of New Composting and AD Facilities
- Financial Risk
- Market Development



Potential Solutions to Meeting Short-Term Goals

- Revise Existing and Develop New Emission Reduction Factors
- Include Avoided Landfill Emissions in CERF
- Identify and Address Conflicting Permitting and Regulatory Requirements
- Offsets
- Facility Improvement Funding Options such as: Grants and Loans, Incentive Payments, Feed-in-tariffs, AB118, LCFS
- Increase Markets for Composting and AD Products



Challenges to Meeting Long-Term Goals

- Infrastructure Improvements
- Quality of Organic Material
- Research



Potential Solutions to Meeting Long -Term Goals

- Develop Sustainable Waste Management System
- Standardize Compost and AD Quality
- Improved Characterization of Avoided GHG Emissions
- Characterize the properties and uses of AD digestate
- Research projects demonstrating Best Management Practices for Compost and AD



Biomass Conversion

Biomass Conversion

- Process of creating energy by burning materials of recent biological origin, such as wood waste
- Reduces landfilling and forest fire hazards, generates renewable power, creates jobs, and reduces GHG emissions

Biomass Use in California by Energy Content (2011)

BIOMASS TYPE	Energy (mm BTU)	Percentage
Agricultural Waste	19,000,000	28%
Forest Wood Waste	24,000,000	36%
Urban Wood Waste	24,000,000	36%
Total	67,000,000	100%



Current Facilities

- 22 commercial biomass facilities in operation in CA
- List frequently changes due to economic challenges
- Six of these facilities are cogeneration facilities using waste heat
- Range from 4-50 MW
- Provides ~2% of CA electricity demand
- ~19% of in-state produced renewable power



GHG Goals

Overall

- New facilities can process additional waste that would otherwise be sent to landfills or open burned
- Result in net negative GHG emissions

Renewable Portfolio Standard

- Biomass conversion facilities eligible for renewable energy credit
- Utilities will pay a premium for energy from renewable sources

Governor's Clean Energy Jobs Plan

- Goal of installing 20,000 MW of renewable electricity by 2020
- Includes a target of 12,000 MW of distributed generation

Challenges

Permitting of New Facilities

- Plants are 25 - 30 years old, need upgrading/replacement
- Difficult permitting process and local opposition to new plants

Financial Risk

- Some existing facilities are marginally profitable and may temporarily shut down when they can't afford to operate
- Transportation of feedstock to facilities can be expensive

Barriers to Increased Utilization of Biomass

- Concern that increases might promote more intensive harvest practices

Development of Small Community-Scale Facilities

- Additional technical and financial assistance is needed, and a stable supply of feedstock material

Emerging Technology

- New technologies that may avoid combustion byproducts requiring costly controls are still in development

Beneficial Uses of Ash Byproducts

- Beneficial uses need to be identified



Potential Solutions

Permitting of New Facilities

- Consolidated permit process, new web - based tools, programmatic EIR

Financial Risk

- Additional funding and incentives from EPIC, Re-MAT, SB32 feed-in-tariff

Barriers to Increased Utilization of Biomass

- Update assessment of biomass resources, outreach to landowners, foresters, and public, define/ensure sustainable forest biomass utilization, develop fire threat maps

Development of Small Community-Scale Facilities

- Refine “community-scale” facility criteria, identify candidate projects, seek developers and cost-sharing partners for demonstration and deployment

Emerging Technology

- Coordinate state resources to pursue RD&D, commercialization

Beneficial Uses of Ash Byproducts

- State/Federal funding to supplement research identifying safe/beneficial uses

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Municipal Solid Waste Thermal Technologies



California MSW Thermal Technologies

- Conventional Combustion Systems (CCS)
- Gasification Systems
- MSW Supplemental Fuel

Only CCS and MSW Fuel used commercially in CA

- 3 CCS (i.e., WTE) Facilities
 - Renewable Portfolio Standard eligibility
- Tires/sludge fuel @cement plants



Municipal Solid Waste Thermal Technologies

Considerations

- Treatment of WTE in Cap and Trade
- Front end processing standards



Challenges

Short Term

- Permitting of New Facilities
- Renewable Energy Credit
- Potential Conflict w/ Recycling Goals
- Cap and Trade Program Impacts
- Financial Risk



Challenges

Long Term

- Emerging MSW Thermal Technology
- Beneficial Use for MSW Thermal Byproducts



Potential Solutions

- Streamline Permitting
- Allow MSW-TT Energy Credit
- Remove Recyclable Materials Prior to Conversion
- Cap & Trade Options
- Low Interest Loans
- Research Technologies/Beneficial Uses



Landfilling of Waste

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California Landfill Status

- 370 Landfills with methane generation potential
 - 220 subject to ARB Landfill Methane Control Measure
- 2nd largest anthropogenic source of methane in CA
- GHG Reduction via
 - Increased LFG collection
 - Reduced organics



Reduction Goals

- Legislation
 - AB 32 – GHG Emission Reduction
 - AB 341 – 75% Recycling
 - AB 1900 – Biogas constituents into pipelines
 - AB 2196 – Biomethane in RPS program



Challenges

- **Markets**
 - Recyclable materials
 - Landfill gas
- **Uncertainty in LF Emissions**
 - Evaluate LFG Collection Efficiencies
 - Improved Emissions Inventory Data
- **Implementation of BMPs**
- **Evaluation of More Stringent Surface Emission Limit**



Potential Solutions

- Regulatory Actions
 - Implementation of BMP's
 - Surface emission limit
 - Regulate landfilling of organics/Cap & Trade
- Update LF Inventory/Emission Factors
- Incentives for LFGTE Systems
- Incentives to Reduce Landfilled Waste
- Further Research



Draft Implementation Matrix

- Lists types of actions and general timeframes
- Dynamic working document/plan



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