California's Challenges

Waste Management
California continues to face a growing waste management challenge:
- In 2003, over 40 million tons of wastes were disposed in California—a two million ton increase over 1988 levels, even though 47% of the State’s wastes are now recycled.
- Factors such as population and economic growth have effectively offset State and local recycling efforts. This trend is expected to continue.
- New landfills are increasingly difficult to site near urban centers. Use of distant landfills creates additional traffic, pollution, energy, and cost issues.
- There are no existing markets or beneficial uses for the bulk of post-recycled materials currently going to landfills.

Energy Demands
California will require 60,000 KW of new electric supplies, the equivalent of 100 new power plants, by 2030. On-road gasoline usage will increase from 15.5 billion gallons in 2004 to 19.8 billion gallons by 2023.
- The existing Renewable Portfolio Standard (RPS) sets a 20% goal for renewable power by 2017, while current proposals would accelerate industry development, including RPS goals to 20% by 2010, and 30% by 2030.
- In 2003, biomass conversion accounted for only 2% of CA’s electrical generating capacity.
- CA has enough available biomass to produce at least 3600 MW of power and more than two billion gallons of ethanol, turning CA into a net exporter of ethanol, rather than a 99% importer.

California's Opportunities

Zero Waste
- Cfs can enhance existing glass, metal and plastics recycling by 7-13% through the pre-processing of incoming waste feedstocks.
- Cfs can divert up to 80% of the post-recycled materials they receive and convert them to beneficial use.
- 50% of the available biomass resides in the municipal waste stream, 30% in the agriculture sector, and 20% in forestry wastes. Cfs can play a central role in developing this critical resource for CA.

California's Needed Initiatives for CT Industry Development
Several states are promulgating affirmative policies to catalyze the development of bioenergy and bio-based industries. Key issues and incentives in CA include:
- Removal of statutory obstacles that equate Cfs with disposal and deny eligibility for landfill diversion credit and renewable energy funding.
- Creation of a comprehensive bioenergy policy for the State that successfully integrates the program objectives and regulatory purviews of its environmental and economic development agencies.
- Creation of a streamlined integrated permitting process for renewable energy projects.
- Creation of market incentives for industry development, including Renewable Portfolio Standard (RPS), Renewable Fuels Standard (RFS), procurement, tax incentives, loan guarantees, and other financial tools.

California's Progress toward a Clean, Abundant Future

Scientific Data Support CT Benefits
Detailed CT life-cycle and market assessments were completed by the University of California and the Research Triangle Institute under contract with the CA Integrated Waste Management Board (CIWMB) in 2004. In addition, independently verified CT emissions data from commercial-scale facilities in Europe, Japan, and from U.S. demonstration facilities are now available. Among the principal findings are:
- The definitions of Cfs in existing statute are scientifically inaccurate. Cfs are distinct from landfills and incinerators—the existing PRC definition of "transformation" should be amended to exclude Cfs, and be limited to mean the combustion or incineration of solid waste.
- Cfs can complement the existing recycling infrastructure and have a positive impact on glass, metals, and plastics recycling.
- On a life-cycle basis, Cfs are superior to recycling, composting, landfills, and incineration in terms of energy balance, NOx emissions and carbon emissions.

Cleaner, Renewable Fuels for California
The CA Energy Commission's AB 2076 report has set goals for 20% non-petroleum fuel use by 2020 and 30% by 2030. Fuels produced from biomass conversion, such as ethanol, biodiesel, Fischer-Tropsch liquids, hydrogen and others will play an important role in reaching this goal, while offering a broad range of environmental benefits.

Why Ethanol?
- Ethanol is an octane enhancer and volume extender for gasoline. It reduces dependence on foreign petroleum.
- Ethanol reduces CO2 emissions and is compatible with existing gasoline distribution systems. CA’s current 5.7% blending of ethanol with gasoline reduces 4 Million tons of CO2/yr; 10% blending would reduce over 7 Million tons/yr.
- 10% ethanol blending would equal 50% of the 2020 goal for non-petroleum fuel use.
- There is enough biomass to produce 1/3 of CA's increased fuel needs by 2023
- When the “Hydrogen Highway” becomes a reality, hydrogen will be distributed to fueling stations in the form of ethanol.

Biodiesel Reduces Emissions
- Biodiesel and biodiesel blends reduce particulates and the cancer-causing air toxics that ride on soot particles.
- B20 produces 15% less CO2 and B100 78% less CO2 than petroleum diesel.
- Biodiesel can be made from oil crops and from local waste fats, greases, and bio-oils.

<table>
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<tr>
<th>Emission</th>
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<td>Air toxics</td>
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  - Pyrolysis
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Benefits for Rural California

In addition to furthering the State’s landfill diversion, air quality, energy, and agricultural goals, this new industrial platform will advance the following:

- Forest Health & Wildfire Protection
  Coupling forest thinning projects with biomass conversion can create a Statewide wildfire prevention strategy that reduces fire suppression costs and enhances renewable energy supplies.

- Water Quality & Watershed Protection
  Replacement of petrochemicals with bio-based chemicals and products can reduce harmful releases to waters of the State from agricultural and industrial operations. Preservation of forest integrity also reduces water quality impacts through erosion and runoff.

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Conversion Technologies:
Ensuring an Environmentally Clean and Abundant Future

Produced in conjunction with the Alternative Technology Advisory Subcommittee of the Los Angeles County Integrated Waste Management Task Force.

The Alternative Technology Advisory Subcommittee is responsible for evaluating and promoting the development of conversion technologies to reduce dependence on landfills and incinerators.

Converting California’s biomass and plastic wastes into renewable fuel, green power, and chemical products

Genetic energy, biorefineries
November, 2005

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